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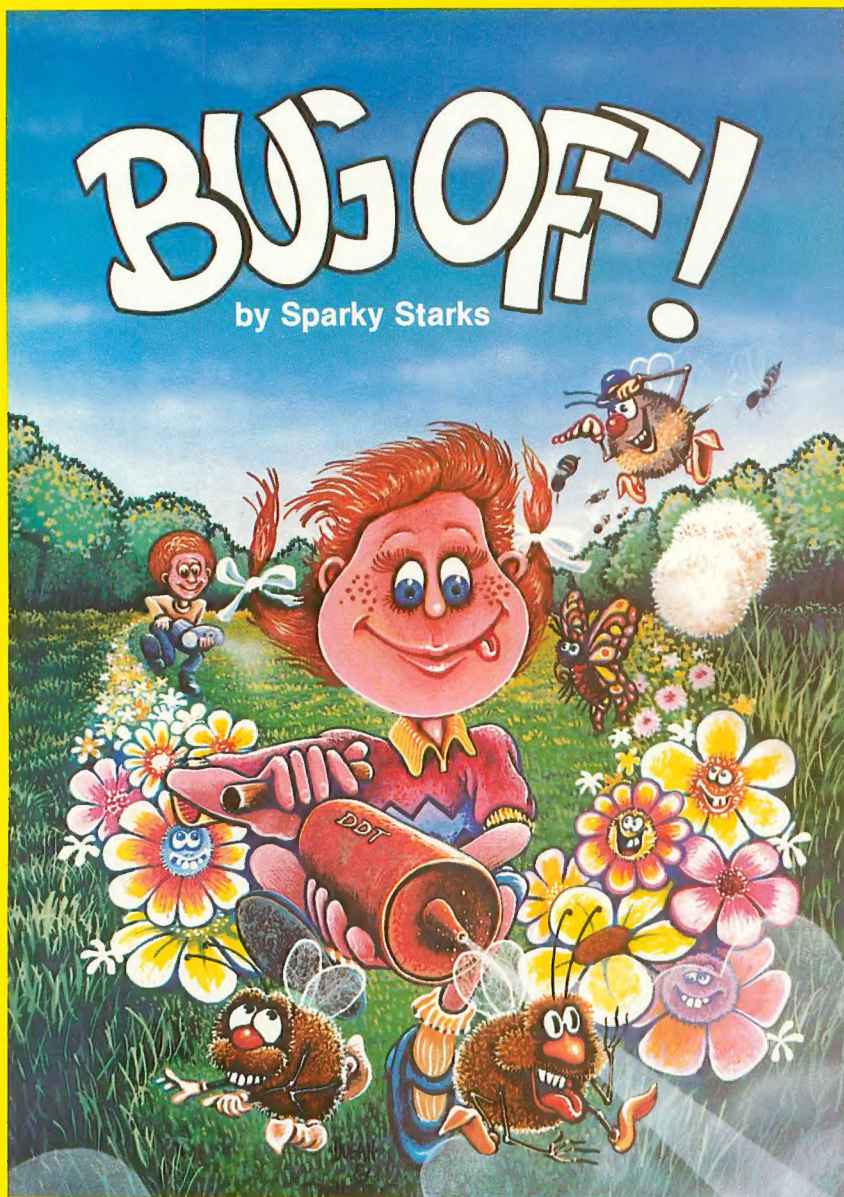


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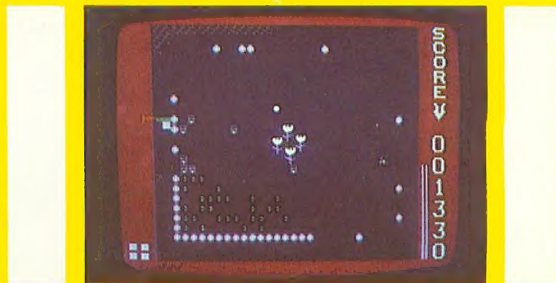


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by Sparky Starks

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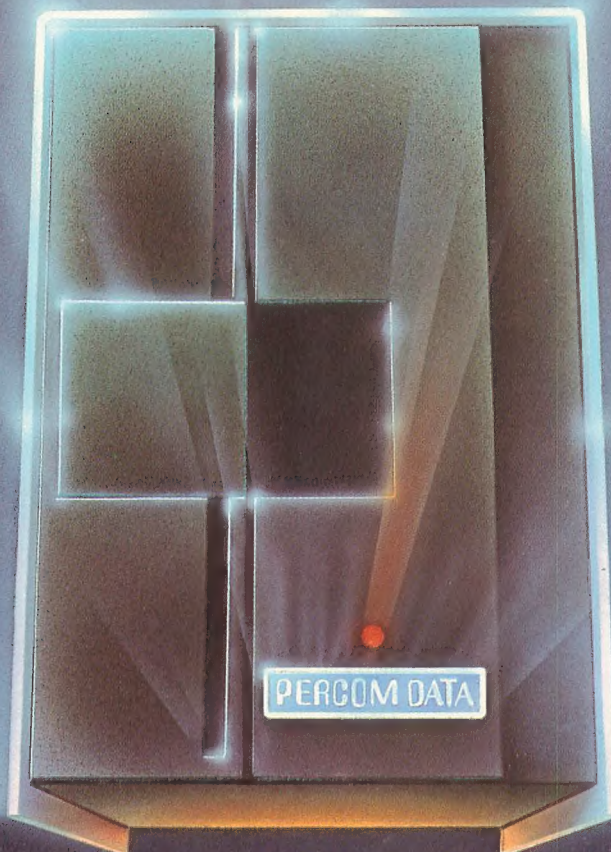
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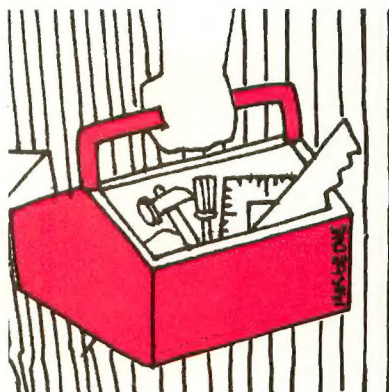
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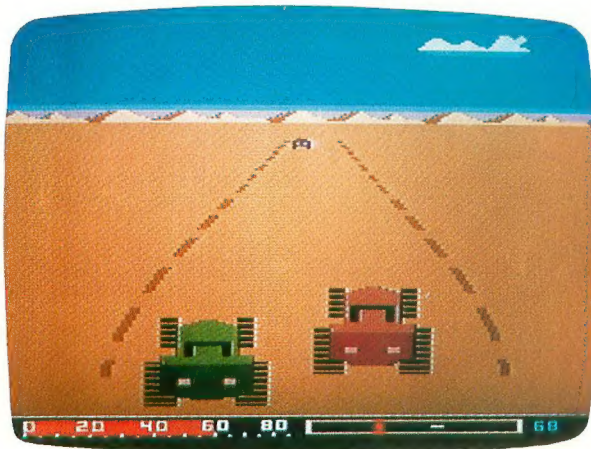
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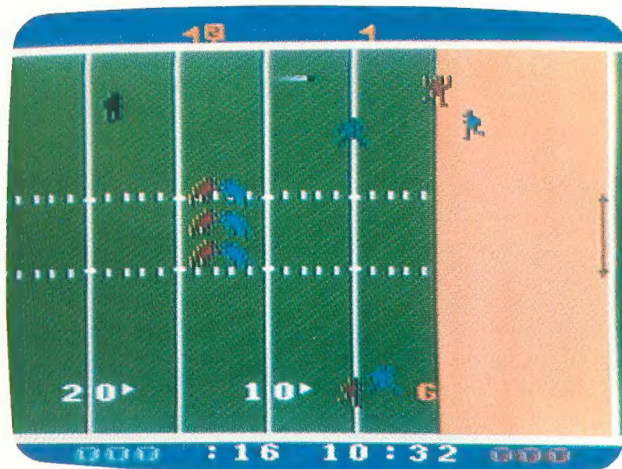
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I/O BOARD

PAC ENHANCEMENT

We have enjoyed PAC INVADERS published in your August '82 issue. I have some suggestions to add to this program. Many readers may find that if "156" and "158" in lines 520 and 530 are replaced by "UJ+4" and "UJ+6", the program will make more sense.

For flashes of light occurring during the explosion, try the following:

```

change: 230 POKE 712,62:
        POSITION N,BHG:?"#6;
        "      ";
        POKE712,54
240 POKE656,3:POKE657,
    8:?"      ";SCORE;
    "      ";
    POKE 712,0:VC$(BG,
    BG + 2) = BH$:LA = 0:
    POKE53278,1:SOUND
    0,0,0,0:RETURN
250 POKE 706-TURNS,0:
    POKE 704,PEEK(710):
    VC$ = BH$:FOR O = 70
    TO 0 STEP -2:POKE
    712,ZZ*(O/4 = INT
    (O/4)):SOUND 0,220,
    8,O/5
add:    251 ZZ = 48 + INT(O/10):
        NEXT O:POKE 712,0:
        GOSUB 420

```

An embellishment is to add a power pill to the display field using the fourth player. If a PAC MAN eats a power pill the game ends instantly. This avoids the feature of having unshot PAC MAN figures disappear below the “horizon”.

```
change: 70 IF PEEK (53259) = 1
        OR PEEK (53259) = 9
        THEN 250
add:    75 IF PEEK (53255) > 0
        THEN TURNS = 2:
        POKE 707,PEEK(710):
        GOTO250
371 DIM PL3$(128):
        POKE 53259,1
395 POKE 53251,124:
```

```
POKE 707,14:PL3$ =
BH$:FOR LP = 93 TO
105:READ N:PL3$(LP,
LP) = CHR$(N):
NEXT LP
```

465 DATA 24, 60, 60, 24, 0
0,0,0,0,0,0,0,0

D. J. Staff & family
Rochester, N.Y.

NO MORE COPY ADS

Frontrunner Software, subject of complaints from ANTIC readers for non-delivery of its product "Superclone," assures us that all orders are now being filled (see ANTIC #5 — I/O Board).

ANTIC *here announces our immediate policy to reject all advertising for products primarily intended to copy software.*

Therefore, absence in ANTIC of advertising for Superclone now may be attributed to this policy and not to failure of Frontrunner to honor its obligations.

FLIP FLOP

I bought the "Star Raiders" and "Basketball" cartridges and am experiencing a "mirror image" with them. Occasionally, [SYSTEM RESET] fixes the basketball game, but not Star Raiders. I have exchanged the cartridges several times, but no change. Also, what do these *memory tests* you see advertised actually do?

Bruce Fuerbringer
Eau Claire, WI

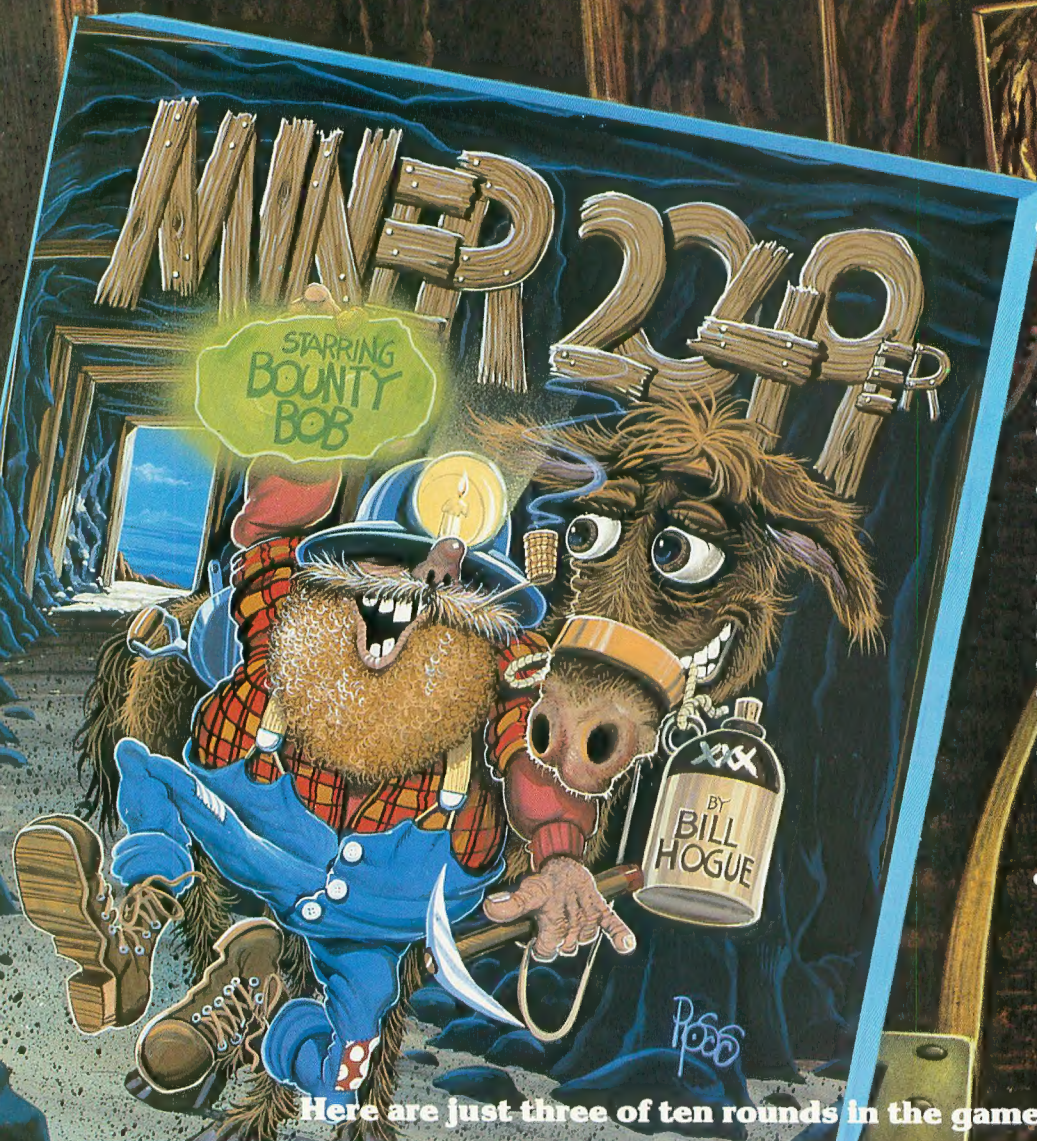
Mirroring sounds like a hardware problem, possibly a slow ANTIC chip. Try the cartridges on other machines to isolate the culprit. Memory tests are of many kinds, but all verify the correct operation of RAM. —ANTIC ED

AD ASTRA

Permit me to introduce the ATARI Microcomputer Network. We are an on-the-air users' group of amateur

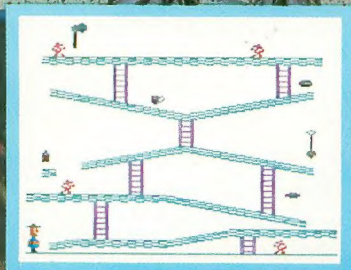
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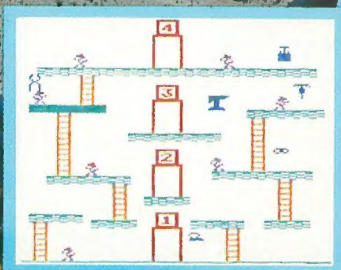


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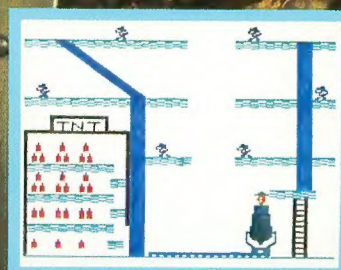
Here are just three of ten rounds in the game:



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continued from page 7

(ham) radio operators and short wave listeners who are ATARI computer enthusiasts.

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Jack McKirgan II,
WD8BNG, National
Net Coordinator
Washington C.H., OH

YES, YES, YES

Does the "Model Station" (ANTIC #5) require an 850 Interface? Does the Letter Perfect cartridge (as opposed to disk) facilitate single disk-drive compatibility with Data Perfect? Is it easy to disconnect the Full-View 80 board so the computer can be used for other things?

Joe Wills
Baton Rouge, LA

Yes, the word-processing setup requires the 850 Interface for the printer. Yes, the cartridge frees the drive for other purposes. Yes, the 80-column board is easily switched for 40-column format. Other readers asked about using double-density PERCOM drives in this situation. PERCOMs work only in single-density mode when storing Letter Perfect, and Letter Perfect is the only word-processor program now compatible with the Full-View 80 board. We have had trouble formatting diskettes for Letter Perfect using PERCOM drives. Both companies are now trying to identify the problem. More later. —ANTIC ED

3-D FAN

I am very impressed with the 3-D effect of ZAXXON. I would really like to see more of it. Can you name any other

games with good 3-D effects?

David Kirkpatrick
Eugene, OR

See our reviews of *Way Out*, by Sirius, and *Baja Buggies*, by Gamestar, in this issue. —ANTIC ED

GENEALOGY

We have only had our ATARI for three weeks, and your magazine has been a great help. Do you know of any software on genealogy?

James Imhulse
Cincinnati, OH

We don't, but maybe our readers do. If so, write I/O Board and we will pass on the info. —ANTIC ED

COLORS

I have designed a little program to show off ATARI's graphics. It uses Graphics Mode 7 and all of the colors.

Marc Halpern
(age 11)
Reseda, CA

```
10 GRAPHICS 7 + 16
20 FOR X=0 TO 159
30 C=C+1:CO. C: IF C=127
   THEN C=0
40 PLOT X,Y:DRAWTO 159-X,Y:
   DRAWTO 159-X,95-Y:
   DRAWTO X,95-Y:
   DRAWTO X,Y
50 Y=Y+2: IF Y>95 THEN Y=0
60 NEXT X: GOTO 20
```



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ATARI 1200XL



the new computer
by LEVON MITCHELL

The newest ATARI computer, the sleek 1200XL, has made its appearance at the head of the family line. It can be used directly as a general-purpose 64K computer, or, with its new Operating System, as an upgrade to the ATARI system of hardware and software, with which it is compatible. The 1200 also offers several new features and suggests developments yet to come.

Improvements in color and sound output are probably the most notable. New chroma circuitry steps up color saturation 100% over the 400 and 800

computers. The sound capability of the POKEY chip is enhanced by the increased audio-amplifier bandwidth. There are several new special-function keys, a HELP key, a set of international characters, and a completely redefinable keyboard.

APPEARANCE

The 1200XL is much trimmer than its siblings, and has no doors or lids. The single cartridge slot is tucked away on the left, along with two controller ports. Ports 3 and 4 have been eliminated to allow OS flexibility, and the RF wire leading to the TV is detachable from the computer, if desired. Other connectors are the same as for the 800. The function keys have been moved to the top of the keyboard and include five new ones. The inverse-video key (formerly Atari logo) has been moved to the function-key row, which will please touch typists who

were bothered by its position on the older keyboards.

THE OPERATING SYSTEM

A new 14K Operating System replaces the old 10K OS used by the 400/800. It supports all the legal operations of its forerunners, corrects a few known problems in these, and takes on some new roles. Most important is a fully-redefinable keyboard. This gives the astute programmer 174 new keys (including SHIFT and CTRL) to work with. The familiar set of ATARI graphics characters remains available.

The OS provides self-checking on power-up. The new HELP key allows the user to test RAM, ROM, Video and Sound output manually. The other new function keys do the following: one turns off the video display (ANTIC), allowing the user's program to run substantially faster; one disables

continued on next page

Levon Mitchell has been in the computer field for more than ten years, the last three with Atari, where he has worked on various projects for the Consumer Electronics Division and the Home Computer Division. He is now with the Special Projects Group at Atari. This material was written with the cooperation and approval of Atari, Inc.

INSIDE ATARI

the keyboard (permitting the computer to be used for control or display purposes without accidental or malicious interruption); another disables the audible "clicks" echoing keystrokes; and the last substitutes an international character set of 29 letters (often used in non-English alphabets) for the standard graphics set. Cartridges can be inserted and removed while the machine is running, without damage to either the machine or the cartridge.

Four ANTIC modes (4, 5, 12 and 14), previously inaccessible except to the Assembly Language programmers, are supported by the new OS and will appear as additional Graphics Modes in the language cartridges. It is also now possible to program certain changes in machine parameters. For example, the automatic key-repeat rate can be speeded up or slowed down.

There are other enhancements only advanced programmers will appreciate. Some of these are: printer unit numbers in the IOCB allowing up to eight printers to be designated; display-handler improvements; and end-of-line automatically appended to the printer-handler buffer.

HARDWARE

The architecture of the 1200XL is similar to the 400/800. ANTIC, GTIA, POKEY and PIA are the same. The 6502 microprocessor, however, is not the same as in the 400/800. It has been improved with on-board logic drivers and the addition of a HALT line. The new machine allows the user to disable the OS and use 62K of RAM simply by toggling a bit in the PIA. However, if the ANTIC, POKEY or GTIA chips are to be used without the Operating System, the user must provide all housekeeping for the chips. There are no parallel-bus output or test points accessible to the user.

SOUND – COLOR

The improvements in color and sound



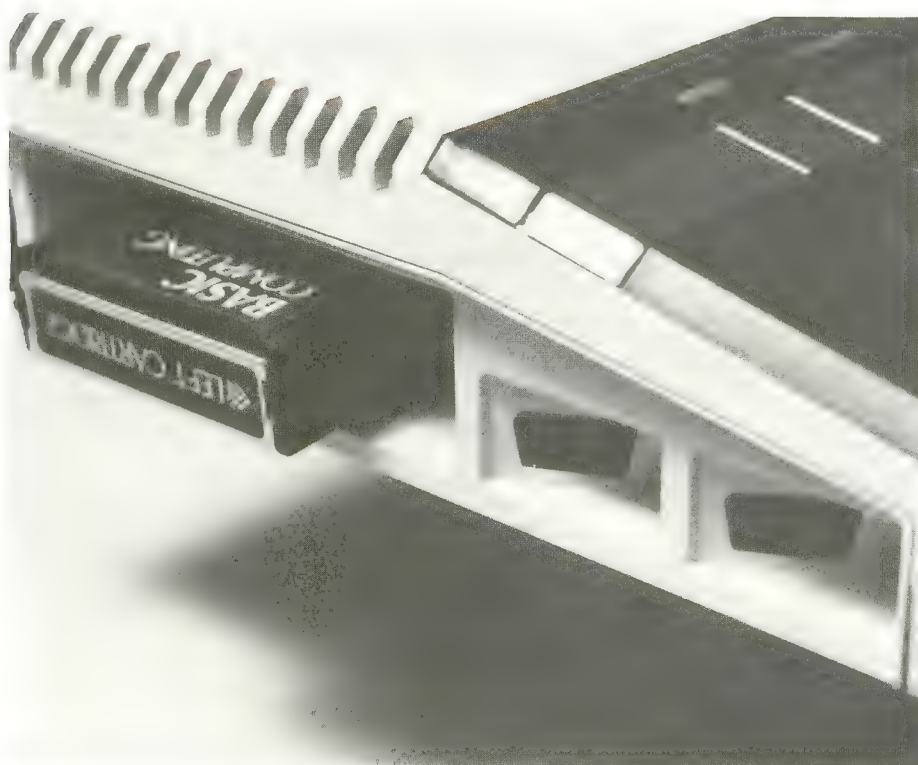
with the 1200, in my opinion, are substantially ahead of other machines in the crowded marketplace of home computers. The designers aimed for equivalence to broadcast-TV color levels, and achieved a 2:1 color saturation improvement over the 400/800. The problem of color bleeding, or overlapping, occasionally seen on the

800, has been reduced by the new circuitry.

Atari has improved the design of the sound processor (POKEY) to produce the widest frequency response available on personal computers today.

SIMPLICITY

All of the electronics for the 1200XL



are on a single printed circuit board. The obvious advantage here is the improved reliability. There are no more insertion problems, bad connectors, or corrosion to worry about.

Three new hardware peripherals designed to match the 1200XL are also included by Atari. These are the 1010 Program Recorder, the 1025 80-column Printer, and the innovative 1020 40-column Printer/Plotter, all of which are compatible with the ATARI 400 and 800 home computers.

The 1200XL is close to being the "super system" some might be expecting. I think it is as much ahead of the competition as the 800 was in 1979. Atari has plans for a full line of new peripherals and software for the 1200 — disk drives, printers, modems, voice synthesizers, etc. I think the Atari community will be pleased with the 1200, and that it is an attractive tool for the serious programmer. **A**

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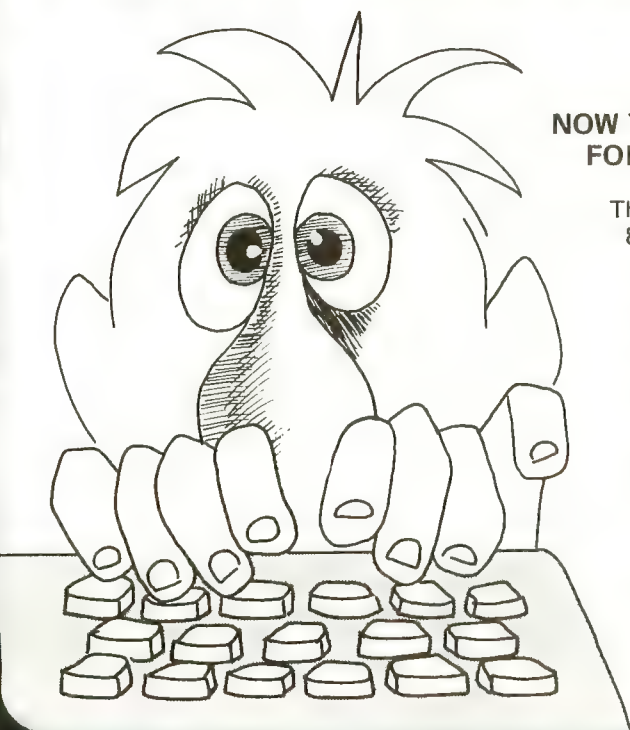
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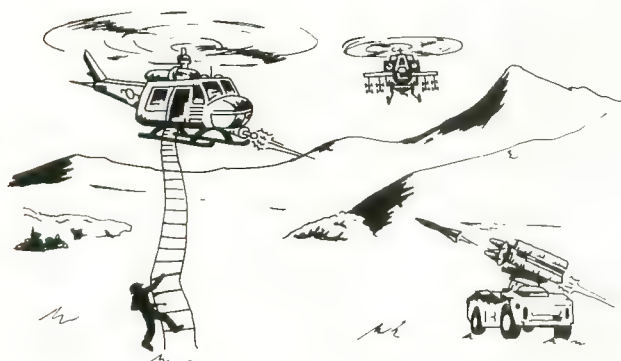


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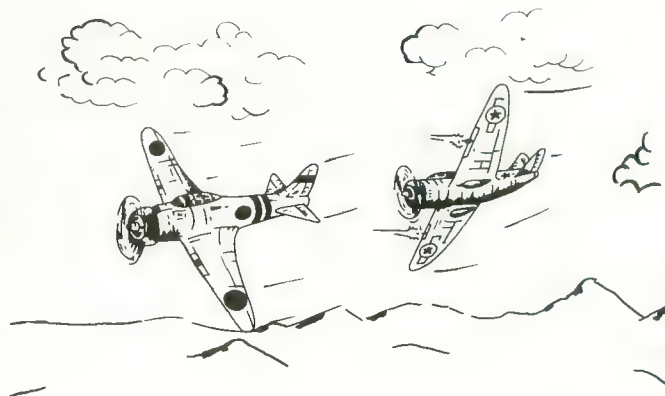
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by BILL LUKEROTH

The ATARI Operator's Manual says you can print lower-case letters in Graphics Modes 1 and 2 by POKEing 756,226. If you've ever tried this you know that it causes the screen to fill up with yellow hearts.

The reason for this is that the lower half of the character set doesn't contain the character that represents a blank space; it was deleted to make room for the graphics symbols. The accepted cure for this condition is to follow your GRAPHICS statement with a SETCOLOR 0,0,0, which turns the hearts black to match the background. However, sentimental fool that I am, once I saw all those beautiful hearts I knew that I had to *do* something with them.

The result was the following little program, which turns the hearts red and prints "i love you" in a moving banner. You could replace my choice of words with something of your own, subject to two limitations: it must be less than 18 characters long and must be typed in lower-case letters only. If you use upper-case letters the screen will print them as *red* lower case letters (which explains the "i" in "i love you"). The program is an endless loop, so you'll have to press [RESET] to get out of it.

This Valentine's Day try surprising your special someone with the usual candlelight, soft music, *and* your newly romantic ATARI. Who knows, he or she might even decide that the computer wasn't such a bad investment after all.

```

10 REM ++++++
20 REM +      VALENTINE'S DAY      +
30 REM +              BY              +
40 REM +      BILL LUKEROTH      +
50 REM +      MARTINEZ, CA      +
60 REM ++++++
70 REM
100 REM REVISION 0.1, WRITTEN 10/18/82
110 REM ++++++
120 REM +              +
130 REM +              +
140 REM ++++++
150 REM
205 GRAPHICS 2+16
210 POKE 756,226:SETCOLOR 0,3,2:REM poin
    t to lower case,color hearts red
220 FOR X=0 TO 11
225 IF X>0 THEN POSITION 1,X-1: #6;"
    ":REM print 18 blanks to
clear line
230 POSITION 1,X: #6;"      i love you "
235 FOR L=1 TO 150:NEXT L:REM delay loop

240 NEXT X
250 POSITION 1,X-1: #6;"
    ":GOTO 220:REM 18 blank spaces again

```


If you are interested in inexpensive custom software that can help you learn about your ATARI, then you should consider programs from APX. The Atari Program Exchange is a separate company, formed by Atari to stimulate the production of programs for their computers, and there are many advantages to using it.

One big advantage for intermediate and beginning programmers is that most APX software is written in BASIC and can be studied, modified and backed up. Other software frequently costs more and is not accessible. You can learn a lot about programming and about your computer by studying and modifying programs. The following APX programs are the ten best I have encountered. I won't repeat the descriptions in the APX catalog but will reference the page number in the fall issue. If you don't have an APX catalog you can get one by calling APX at 800-538-1862 (California 800-672-1850).

The first problem I had as a disk-drive owner was in keeping track of a rapidly growing collection of files on my diskettes. The **Diskette Librarian** (p.67) was the answer. This program automatically creates a catalog of diskette files by reading your diskette directories and adding some data via the keyboard. The catalog locates those elusive programs and data files. You can search for files not only by name but by file

description, type of file (basic, assembler, data, etc.), date of creation, or even by file size. Suppose you wanted to find a demo you created last month but can't remember the name. Do a catalog search for all files with the filename extender of demo, read the description of each file, and pick the one you were looking for. The Librarian will tell you which diskette it is on and will even run the demo for you if you would like. Also, you can learn about disk I/O and screen formatting, from reading

is such a system. A simple use of this program would be to keep a list of credit cards and appliance serial numbers in case of loss or theft. A more sophisticated use could be a birthday / anniversary data base. You could store names and dates along with gift preferences. This APX data base has a somewhat limited search capability but it is the best inexpensive way I have found to learn about data bases. Some ideas for using a data base are: stamp and coin collection catalog, coupon file, magazine arti-

computer (see ANTIC #2). Watching the demo is the best way to understand the three new graphics modes provided by the GTIA. The documentation contains an excerpt from the book *De Re ATARI*, and there is a brief discussion of three of the programs on the diskette.

Getting control of your life probably involves getting control of your money. **Family Cash Flow** (p.10) can help. Enter information on your income and expenses and the program generates reports, both summarized and detailed, on exactly where your money is coming from and going. If you've never taken a good look at your cash flow you're probably in for a surprise. Learn about "user-friendly" programs from this one. User-friendly means that the program requires you to know little about handling the program itself so you can concentrate on the problem you are using the program to solve. The program accomplishes friendliness through the clever use of menus.

BLIS (p.71) is a program that prints other BASIC programs in an easily readable format. Most BASIC programs are compressed to save memory. Unfortunately, this makes them very hard to read. BLIS will help you read BASIC programs, to learn from or modify them. You will have to modify this pro-

TEN

best
from
APX

by JORDAN W. POWELL

the Librarian program. Suggested modifications include: adding an option to print diskette labels; expanding the size of the date field to eight characters; adding an option to go directly to DOS; and adding an option to print the catalog.

One of the most useful applications yet found for computers is the data base. A data base is a collection of information together with some method of adding and retrieving information from the collection. The **Data Base Report System** (p.12)

cle or literature index, property inventory for insurance purposes, addresses and phone numbers (if the list is sufficiently long) or a ham-radio log. This product is also instructive about the creation of records on disk, screen formatting, and passing control between programs.

You've undoubtedly heard about the GTIA chip and you may be wondering just what it can really do. The **GTIA Demo Diskette** (p.73) will show you, if you have the GTIA chip in your

gram in order to use printers other than ATARI (Centronics) because they use different control codes.

Eastern Front 1941 (p.42) is a game masterpiece, a brilliant simulation of battle conditions on the eastern front in WW II. You are the general in charge of the German invasion of Russia in 1942. You also command individual units in tactical battles. The game is played on a scrolling map which, while changing with the seasons, graphically conveys information about the terrain, unit positions and strengths, supply lines and troop movements. This game is written in Assembler and the source code is available as a separate product (p.43), useful for study. Would-be game programmers can learn a great deal about game engineering from this program.

Snark Hunt (p.38) is a game of logical deduction. You are given the simple

rules of behavior of vorpal beams as you shoot them into a grid. By their behavior you must determine the whereabouts of the hidden snarks. Don't be fooled by this seeming child's game. Techniques similar to this were used in deducing the structure of DNA. This game, though a bit noisy, is absorbing and fun to play. Reading the BASIC code offers information on the use of sound, the joysticks, color, alternate character sets and BASIC graphics.

To show off ATARI's musical capabilities you need **Jukebox #1** (p.51). This is the best ATARI music-playing program I've ever heard; it has actually increased my interest in learning about music. As a demonstration to impress friends it is a sure thing. This diskette was created using Advanced Music System (p.21) and can be used to see what that program can really do.

You won't get musical quality out of the ATARI's tone generators, but if you learn about music you'll be able to actually write your

own music and play it without having to master a musical instrument.

If the music bug bites you as it did me, you might find **Music Tutor** (p.34) useful. This is a basic course in music. You will need at least the knowledge presented here to use Atari's Music Composer or the APX Advanced Music System previously mentioned. It's more fun than reading a book on the subject. Be sure you load it exactly as the instructions tell you.

The **Atari Program Text Editor** (p.62) is a powerful microcomputer tool. It has many features found on large mainframe text editors. Suppose you wanted to find a particular POKE in a BASIC program; instead of getting bleary-eyed searching through the code you have merely to enter a short search command and it will find your POKE for you. If you want to change a variable name, you can change it through-

out the entire program all at once. Atari BASIC has an unfortunate bug in that it locks up the machine if you try to delete too many lines of a program. The Text Editor makes such deletions easy. You can copy part of one program into another or create a file with part of a program in it, then you can build a new program around it or just save it for use in other programs. For creating data files or program source code, this is the way to go. This program is very good and useful but the manual sometimes is hard to understand. Once you learn and use the Text Editor you'll never want to be without it.

I hope I've given you some ideas which will enhance your enjoyment of your ATARI computer. I've found this APX software both useful and educational.

APX actively solicits software written by ATARI users, publishes it and pays royalties to the writers. Perhaps we will see your programs there some day.

A

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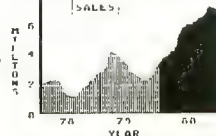
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STARTING LINE

by JON LOVELESS

UT

UT

If you are one of those who found an ATARI under your Christmas tree, welcome to ANTIC, and, I suppose, welcome to the world of computers. This regular column is designed to help you ease into computing with a minimum of intimidation.

Many people find the ATARI, or any computer, a fearsome and complicated piece of equipment. You may be encouraged to know that it is not so much the computer that you should be leary of, but the jargon. Bits and bytes, RAM and ROM, OS and DOS, are all new terms, very strange and confusing. Even the theme of this issue of ANTIC is a bit (pardon the pun) forbidding. By the time you have given these pages a fair reading, however, you may realize that there is hope that even you can understand this computer business.

So, let's explore our theme topic a little. We have decided to give you a taste of what are known broadly as "utilities." Utilities are computer programs that make life easier for the computer operator or programmer.

Many people think that only programmers use these utilities, and as a result they are not quite sure they want to get into it. Programmers *do* use utilities, and many write their own to make the job of writing other programs easier, faster, and more efficient, or just plain fun. If you can turn on your computer and do something other than run a commercial program, then *you are* a programmer (though perhaps not yet proficient). Chances are that you already need, want and should have utilities to help you along.

One of the best ways to learn your ATARI is to fiddle around with utilities, and sooner or later you will write your own. If you have a disk drive and a diskette with some DOS files on it, type in this short routine which will illustrate my point:

```
10 REM ** DISK DIRECTORY FROM BASIC **
20 DIM TITLE$ (20)
30 OPEN #1, 6, 0, "D1:*. *"
40 INPUT #1, TITLE 1
```

Jon Loveless is a contributing editor of ANTIC and Vice President of Marketing for Synapse Software.

& AWAY
Two easy utilities

```
50 PRINT TITLE$
60 IF TITLE$ (5,8) = "FREE" THEN END
70 GOTO 40
```

```
ALLOW 20 CHARACTERS
OPEN THE DIRECTORY
GET THE FIRST NAME
PRINT IT
STOP WHEN DONE
GO GET ANOTHER
```

*explanation
of
program*

Run this program and behold the magic of a utility! Before your very eyes the contents of the disk in drive #1 will be displayed on the screen. This, of course, assumes that you are not using a disk from one of the many software manufacturers, but an ordinary, formatted disk that has been used. This program allows you to see what's on a disk without having to resort to the DOS menu.

As you may know, when you load DOS into memory, it not only takes a few seconds, but it also normally wipes out your BASIC program. You can change the PRINT in LINE 50 to LPRINT and the information will be printed out on your printer. This routine, then, is useful, time-saving and definitely qualifies as a utility.

Here is another utility, or rather, the beginning of a utility, that will allow you to test and demonstrate the screen-editing of the ATARI. It simply accepts characters from the keyboard and prints them on the screen, but in so doing, it also accepts the screen-editing features built into the keyboard.

```
10 REM ** SCREEN TEXT EDITOR **
20 PRINT CHR1 (125)
30 OPEN #1, 4, 0, "K:"
40 GET#1, A
50 IF A = 27 THEN END
60 PRINT CHR1 (A); :GOTO 40
```

```
CLEAR THE SCREEN
GET THE KEYBOARD READY
READ A KEY-PRESS, CALL IT "A"
```

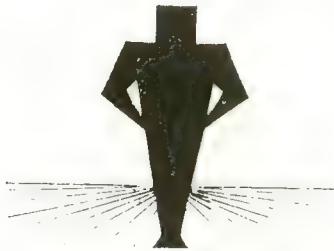
*explanation
of
program*

continued on page 20

NEW FOR ATARI

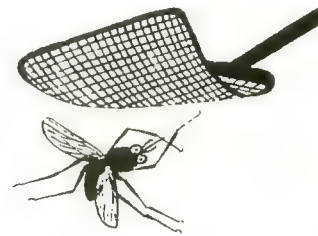
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 - TRACE UNTIL - change variables
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 - edit your whole program easily
 - no more LIST line number ranges
- **Split screen mode**
 - view two parts of your BASIC program at once, and edit both!
 - scroll each window independently
- **CROSS REFERENCE**
 - provides a list of variables and the line numbers in which they are used in your program
- **SEARCH FOR PHRASE**
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STARTING LINE

continued from page 18

PRESS [ESC] TO STOP THE PROGRAM
PRINT THE LETTER AND GET ANOTHER

In its present form, this routine doesn't have a practical use other than to demonstrate the keyboard and to whet your appetite. Fiddle around and see if you can make it into a full-blown utility. As a starting point, in LINE 50, rather than END you could have the program do something else. Or, in LINE 60 you could again replace the PRINT with LPRINT and have a crude typewriter. Use your imagination, keep it to 20 lines or fewer and send it in to me at ANTIC. We will publish the best expansion of this shortie in a future issue, and make you famous!

I hope that this has lightened the burden that usually plagues the new computer owner. Remember that utilities are not magical, they are helpful. One line routines that make your ATARI easier to use are as much a utility as the professional programmer's character generator.

Above all, learn about your machine by playing with it rather than working with it. You will find it very responsive, quite patient, but very exacting. The pages of ANTIC will help you as you learn. **A**

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PRONTO

bank on your atari

by DEBORAH BURNS

Soon you may be able to use the ATARI to do your banking without ever leaving home. A pilot electronic banking program called PRONTO was started last year by The Chemical Bank of New York for some of its customers who owned ATARIs, and is now being licensed to many more banks across the country. Crocker National Bank in San Francisco, Worthen Bank in Little Rock, and Florida National Bank in Jacksonville are just a few of the other financial institutions that have opted to use PRONTO for a test run in 1983.

The model program that began in New York served 200 customers of Chemical Bank willing to participate in this experiment. PRONTO is an extension of other electronic banking services offered by the bank that has included a corporate cash-management system and computer-automated tellers.

To begin using PRONTO, a customer needs to own an ATARI computer, a standard telephone line and a modem. Each home computer system serves as a "terminal" for the main program that runs on Tandem Computers at Chemical Bank headquarters. The user connects with the main system by dialing a local network number for the bank via phone and modem to begin transactions on a home video screen.


When the first test run began last November, PRONTO customers had to use an acoustic-coupled modem to transmit and receive data. This type of modem has two foam "cups" into which the earpiece and mouthpiece of a standard telephone are placed. Customers used the ATARI 830 (acoustic-coupled) Modem along with the ATARI 850 Interface device and a special cartridge to activate the program. The long-awaited 835 (direct-connect) Modem for the ATARI was not available at the time, but should be soon.

Direct-connect modems are more advanced and much easier to use, and will eventually replace all acoustic-

coupled types. The ATARI 830 Modem connects directly with a telephone wall-jack or plugs into the telephone with a "Y" adapter. Most software communications systems that use a modem also require extra software such as TELELINK. The PRONTO system includes a communications-software cartridge, similar to TELELINK, that is supplied to the user at no extra cost.

The PRONTO software is a complete financial management system that allows you to get instant information about your bank account. It also provides screens with forms for household budgets. You may register checks, pay bills, send electronic mail to other PRONTO users and keep accurate tax records that include principal and interest categories. The budget screens allow you to list up to 50 items and five different personal budgets per household. Each family member can have a secret access code to insure privacy. You may monitor all your account activities and get an "electronic statement" along with your usual monthly printed statement.

Most people who were asked to participate in this project responded enthusiastically. In San Francisco, Crocker Bank announced to its employees and the general public that it was looking for participants to begin the PRONTO pilot in early 1983. The fifty openings for test users at Crocker were filled immediately. A total of 200 customers and employees are expected to be using the PRONTO pilot in San Francisco by July. Many users of the Crocker system will have the option of using other hardware, such as the IBM PC or the Apple II.

The banks have not yet determined how much to charge for PRONTO, but when Chemical Bank queried its pilot customers, most agreed that they would be willing to pay about \$10 a month for this service. If you feel that you may be interested in this type of service, ask your own bank. Who knows? It may be offering electronic banking like PRONTO in the very near future. 



by THOMAS KRISCHAN

Imagine sitting in your easy chair in front of the color television set with a stereo speaker to your right and left. The Star Raiders cartridge is in the computer. After selecting your destination you press "H". A slight rumble emanates from the speakers as the engines engage. From the forward view, you see the stars moving faster and faster towards you as the sound increases to a roar. You explode into hyperwarp and the sound from the speakers rattles your chair. RED ALERT! You reach for the joystick to direct your photons but it's too late! You receive a direct hit from Zylon fire. The room echos from the impact, the vibration causes little nick-nacks to fall from the cabinet shelves. DAMAGE CONTROL. You can hear the cries of your injured crew reverberating through your star cruiser. No, its your neighbors yelling for you to turn down your stereo. What excitement! Maybe next time you should use the head sets.

Tom Krischan is Chief Executive Officer of Technimetrics Computer Consulting, West Allis, Wisc., manufacturers of a variety of computer accessories.

Table 1. List of Components.

Item	Distributor	Price	Comments
5-Pin Audio/Video Plug	Radio Shack (#274-003) APX (#90002;\$2.49)	\$1.49	Shielded
RCA Type Phone Plug	Radio Shack (#274-339)	\$1.39	Shielded
10 Ft. PVC Insulated Cable	Ask Local Electrician	\$4.61	0.25" O.D., shielded 2AWG 10-12 conductor
Total		\$7.49	

You can make a simple, inexpensive cable that will channel audio from your ATARI 800 to your stereo speakers. This article will show you how.

The cable will attach to most stereo systems or radios. Unfortunately, the other end will only attach to an ATARI 800 computer, where the monitor is external. The ATARI 400 would require disassembly, interior soldering and case modifications. There are three components that you need to buy. We have listed these items, their approximate cost, a possible distributor and comments in Table 1.

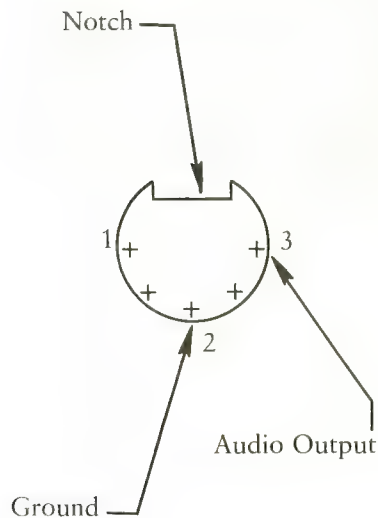
The 5-Pin Audio/Video Plug is sometimes called a 5-Pin DIN plug. The outer jacket can be made of plastic (\$1.49) or metal (\$2.49). It contains five small pins mounted through an insulator panel and arranged in a

180-degree arc. There is a small notch at the top for alignment purposes (Figure 1.)

One side of the insulator panel usually has small numbers printed on the board. These numbers correspond with the numbers in Figure 1. For our purposes, it is important to know that the ATARI 800 uses pin #3 as the audio output and pin #2 as the ground. The RCA-type phono plug has an outer jacket of metal. The inner workings contain one large pin held in place by insulation. These units are usually sold in pairs since the typical use is for a two channel stereo input. The large pin is the audio input and the outer jacket is the ground.

PVC insulated cable is sometimes called telephone cable. There are hundreds of different types of cables to choose from. We recommend a tinned

Figure 1.
5-Pin Audio/Video plug configuration
(outer facing side)



copper, PVC insulated, conductor cable with 22–24 AWG stranded drain wire. Wire gauges much larger than 22 (i.e. 18, 16, 14 . . .) are very stiff and difficult to work with. Stranded wire should be color coded. The cable should be jacketed in a chrome PVC with an outer dimension (O.D.) of 0.25 inches to ensure a snug fit with our plugs. If you choose a smaller cable (eg. speaker wire) you run the risk of pulling the wires out of the plugs or crimping the cable when you move the computer. If you have your computer in an area of severe electrical interference, we suggest that you purchase a cable with aluminum-polyester shielding. The minimum length for your cable should be ten feet to allow for some flexibility in where you can place your components.

Next, gather the necessary tools for soldering. You will need a pencil-tip soldering iron with a heating element of 25 to 35 watts. The best solder for this application is an alloy of 40% tin and 60% lead with a resin flux core. This is sometimes referred to as television or electrical repair solder. In addition, you will need a razor, a needle-nose pliers, a wire cutter, a clampable heat sink and a clean, well-lighted work area. Remove the outer jacket from each plug and slide the

jackets onto opposite ends of the cable. With a razor, carefully strip away $\frac{3}{4}$ " of the PVC cable cover from each of the cable ends. If your cable contains more than two color-coded wires, snip off the extra ones to make them flush with the PVC cable cover. Compare the ends of the cable side-by-side to make certain that the color codes are an exact match. Strip away $\frac{1}{4}$ " of the color-coded PVC from each wire (Figure 2). You are now ready to solder.

Hold the inner workings of the plugs with a pliers and attach the heat sinks to the appropriate areas. Solder ground to ground and audio to audio. If the insulators begin to melt, discontinue soldering and attempt to re-straighten the pins. Once soldered, re-assemble the plugs. Firmly insert the 5-pin plug into the ATARI 800 monitor jack and the RCA-type phone plug into the accessory or tape (in) jack on the back of your stereo. Boot something musical onto your 800, turn down the volume on your TV and switch your stereo to accessory or tape. If you have a stereo/mono switch, place the switch in mono position. Otherwise, the sound will only come through one speaker. Very slowly, turn up the volume. You should hear perfectly clean music. If

you hear a hum, you have a poor connection. Check that your solder has not bridged across the insulator.

For the adventurous experimenter, you could also build a frequency separator making this a pseudo stereo rather than a monotone cable. Use a high/low frequency shunt and patch the high frequency to one channel and the low frequency to the other. I'll leave the design up to your imagination. In addition, the strength of the audio signal could be monitored and used to control some other devices. For example, you could place a fan on the top of your television and an inclinometer platform beneath your chair. As you enter hyperwarp, the fan would blow faster and faster, and you would gently sink back into your seat. The seat would jolt whenever you were hit by enemy fire and it would pulse during engine damage. An affixed 'Le Stick' on the arm of your chair would allow you to bank to the right or left, climb or dive, by shifting your weight. The ultimate in home aviation simulators!


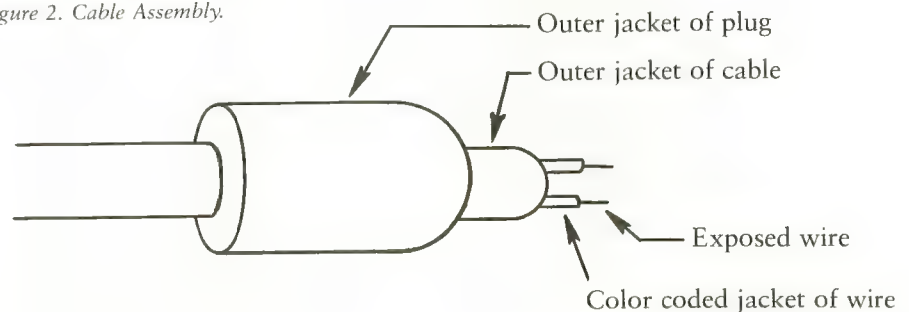
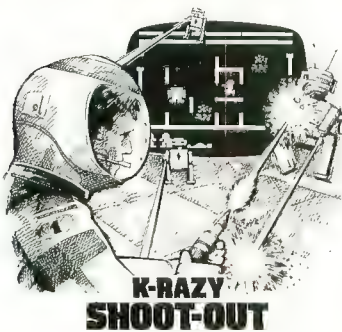
If you live on an island atoll and have no access to parts or are scared to death by the sight of a soldering iron, send me \$24.95 for an assembled and tested audio cable. Otherwise, build it yourself and save a few bucks. 

Figure 2. Cable Assembly.



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TOOL BOX



by JERRY WHITE

Utility programs are the programmer's toolbox. Any job becomes easier when you have the right tools. If you will be writing programs using Atari BASIC or Assembly Language, you may benefit from some of my favorites.

I will briefly describe the various software utility products I have found most useful. But before we talk about software, let's define what I consider to be the minimum hardware configuration required for serious software development on ATARI 400 and 800 computers. Yes, you *can* write programs on an 8K computer, but many of the most useful utility packages require a minimum of 32K RAM and one disk drive. I use an 800 with 48K, two 810 Disk Drives, an 850 Interface, an EPSON MX-80 printer, an AXLON RAMDISK, and a few other goodies. Although all of these peripherals are not necessary, I really can't see how you can work efficiently without 48K of RAM and at least one disk drive.

The list of languages available for ATARI computers is growing rapidly. While consideration might be given to the use of "C", Forth, Pascal, and PILOT, at least 90% of the software currently available for ATARI computers is written in BASIC, Assembly, or both.

I have found **The Basic Commander** from MMG Software to be a real time saver. This utility package locates itself in less than 5K of RAM, and places a wide range of useful functions at your fingertips. Without using Page Six, it provides many DOS functions, program renumbering, automatic line-numbering, block delete of a range of lines, user-definable softkeys, and pre-defined softkeys.

APX provides a number of useful utility products including **MASHER** (a BASIC program compressor). **MASHER** assigns numeric variables to the most frequently used numeric constants in your program, deletes REM statements and concatenates lines of code whenever possible. Although **MASHER** is probably the slowest utility program I've ever seen, it can cut program size down by as much as one-third.

XREF, from APX, is a cross reference utility program that rivals

MASHER for speed. It comes in handy as a debugging tool for finding each reference to all of the variables used in your BASIC programs. It also lists the number of times each numeric constant is used.

Usually, the most time consuming part of writing a program is in creating sound effects, music, and graphics. While there is no single utility package that can do it all, a combination of various products can certainly be a great help.

APX provides a decent sound effects generator called **INSOMNIA**. This program is somewhat limited, but I have yet to find anything better.

Another approach to sound effects and music is provided by Educational Software's **Tricky Tutorials**, #6 and #10. **Tricky Tutorials** teach by example and provide useful routines that you can use in your own programs. As of this writing, there are about a dozen of these excellent teaching programs.

As for music, the only music composing packages currently available to my knowledge, are **The Advanced Music System** from APX and ATARI's **Music Composer**. Unfortunately, neither provides an easy way to get the music files they generate into your own programs.

continued on next page

You can easily convert your Music Composer files into a new format with P.D.I.'s **Music Box**. Using the routines provided, you may then play your music during vertical blank interrupts, while BASIC is at your disposal.

There are a number of good utilities available for creating colorful, high-resolution graphics. Of the many character graphics products, my favorites are the character editor in Educational Software's **Tricky Tutorial #8**, and Sheldon Leemon's **INSTEDIT** (available through APX.)

For Player/Missile Graphics, Swiftware's **PM-800** is a standout. It goes far beyond providing an excellent editor by also supplying a host of Assembly subroutines that you can use in your own BASIC programs. These subroutines provide everything for VBLANK joystick reading and Player/Missile movement to collision detection.

Two of the best playfield graphics utility packages are **DRAWPIC** from Artworx, and Datasoft's **MicroPainter**. Another alternative is the **Versa Writer**

Graphics Tablet, from Versa Computing, which combines hardware and software.

For writing Assembly subroutines and programs, I recommend the **SYN-ASSEMBLER** from Synapse Software. For very large Assembly programs, Atari's **MACRO ASSEMBLER** along with **DDT** (Dunion's Debugging Tool from APX), are real power tools.

That sums up my toolbox, although there are no doubt many fine and useful utility products not listed here. I've listed only those that I use myself, and those I can recommend from experience. If you're thinking about buying a package that I did not mention, look for magazine reviews of that product, or ask your local dealer to recommend the right tool for your job. You may contact the vendors of the products I mentioned at the addresses listed below.

APX (Atari Program Exchange)
P.O. Box 427, 155 Moffett Park Dr.
Sunnyvale, CA 94086

ARTWORX SOFTWARE CO.
150 North Main Street
Fairport, NY 14450

DATASOFT INC.
19519 Business Center Drive
Northridge, CA 91324

EDUCATIONAL SOFTWARE
4565 Cherryvale Avenue
Soquel, CA 95073

M. M. G. SOFTWARE
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SOFTWARE

Inhome Software Incorporated, 2485 Dunwin Drive, Mississauga, Ontario L5L 1T1. (416) 828-0775. Made in Canada.

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EXTENDED DIRECTORY

by WES NEWELL

For some time now I have been unhappy with only having eleven spaces, including filename extension, to use for disk directory filenames. This forced me to undertake the task of trying to modify the DOS to accept longer filenames. Well, after many long and sleepless days and nights, I finally completed the job. The following Assembler source code will produce the program to modify DOS 2.05.

The following advantages will be noticed:

1. Filenames to a maximum of 27 characters.
2. Any ASCII character from decimal 48 to 122 is legal anywhere within the filename, even the first character.

These are the disadvantages:

1. The modified DOS will not read the directory of the old DOS and vice versa. The directory can be changed to allow either DOS to read the other.
2. Allows 60 files maximum. That's four less than the current DOS 2.05.
3. The disk format will take up seven more sectors, leaving 700 free sectors instead of 707.

4. Because DOS.SYS and DUP.SYS will both be modified, I have changed the name of DUP.SYS to dup.sys (lower case) to keep from loading one system with the other.

EXAMPLE

If you boot with the old DOS and put a diskette with the modified DOS on it into the drive and call up DOS, the system will not see DUP.SYS since it has been changed to dup.sys. Therefore the system will return control back to you. This works in reverse if you boot with the modified DOS.

If you are happy with the filename structure as it is now, wait until you have a hundred diskettes or so and a thousand different files and try to remember what CRUNCH CRCHO means. Calling the file Crunch_Crumble__ and__Chomp would be so much easier, and you still have the three-character extender left over.

I will not go into detail as to how the program works but I think you will be happy with the results.

Also included with this article is a program that will automatically convert your directory to the modified version, provided you have copied the files to a diskette that was formatted using the modified DOS.

```

0000      45          .PAGE
0000      50 ;COPYRIGHT 1982 W. NEWELL
0000      60 ;NEWELL INDUSTRIES

0000      0100      *=    $4000      ;ORG AND RUN ADDRESS
0000      0110      LDA    #$1A      ;FROM THIS LINE TO
0000      0120      STA    $093B     ;LINE 1170 MODIFIES
0000      0130      STA    $22A5     ;THE DOS AND DUP
0000      0140      STA    $2436     ;SYSTEMS
0000      0150      LDA    #$1B
0000      0160      STA    $0973
0000      0170      STA    $0C1E
0000      0180      STA    $0EB5
0000      0190      STA    $0F6D
0000      0200      STA    $30EF

```


ASSEMBLY LANGUAGE

401C	8D0924	0210	STA	\$2409	409B	A901	0700	LDA	##01
401F	A921	0220	LDA	##21	409D	8DCC23	0710	STA	\$23CC
4021	8DCE0D	0230	STA	\$0DCE	40A0	8DD923	0720	STA	\$23D9
4024	8D660E	0240	STA	\$0E66	40A3	8D2A24	0730	STA	\$242A
4027	A960	0250	LDA	##60	40A6	8D4724	0740	STA	\$2447
4029	8D2D0F	0260	STA	\$0F2D	40A9	8D3A24	0750	STA	\$243A
402C	A920	0270	LDA	##20	40AC	A925	0760	LDA	##25
402E	8D390F	0280	STA	\$0F39	40AE	8DD123	0770	STA	\$23D1
4031	8D900B	0290	STA	\$0B90	40B1	8DDA23	0780	STA	\$23DA
4034	A9A0	0300	LDA	##A0	40B4	8D0A24	0790	STA	\$240A
4036	8D8E0B	0310	STA	\$0B8E	40B7	8D2B24	0800	STA	\$242B
4039	8D9B0B	0320	STA	\$0B9B	40BA	8D4824	0810	STA	\$2448
403C	A906	0330	LDA	##06	40BD	8D3B24	0820	STA	\$243B
403E	8D8F0B	0340	STA	\$0B8F	40C0	A943	0830	LDA	##43
4041	A99D	0350	LDA	##9D	40C2	8D4423	0840	STA	\$2344
4043	8D910B	0360	STA	\$0B91	40C5	A94F	0850	LDA	##4F
4046	A90B	0370	LDA	##0B	40C7	8D4523	0860	STA	\$2345
4048	8D920B	0380	STA	\$0B92	40CA	A950	0870	LDA	##50
404B	A9EA	0390	LDA	##EA	40CC	8D4623	0880	STA	\$2346
404D	8D930B	0400	STA	\$0B93	40CF	A959	0890	LDA	##59
4050	A904	0410	LDA	##04	40D1	8D4723	0900	STA	\$2347
4052	8D9C0B	0420	STA	\$0B9C	40D4	A949	0910	LDA	##49
4055	A9A9	0430	LDA	##A9	40D6	8D4823	0920	STA	\$2348
4057	8D9D0B	0440	STA	\$0B9D	40D9	A94E	0930	LDA	##4E
405A	A900	0450	LDA	##00	40DB	8D4923	0940	STA	\$2349
405C	8D9E0B	0460	STA	\$0B9E	40DE	8D4D23	0950	STA	\$234D
405F	A907	0470	LDA	##07	40E1	A947	0960	LDA	##47
4061	8D9C12	0480	STA	\$129C	40E3	8D4A23	0970	STA	\$234A
4064	A930	0490	LDA	##30	40E6	A92D	0980	LDA	##2D
4066	8DEA0E	0500	STA	\$0EEA	40E8	8D4B23	0990	STA	\$234B
4069	A97A	0510	LDA	##7A	40EB	A944	1000	LDA	##44
406B	8DEE0E	0520	STA	\$0EEE	40ED	8D4C23	1010	STA	\$234C
406E	A91D	0530	LDA	##1D	40F0	8D5C24	1020	STA	\$245C
4070	8D430E	0540	STA	\$0E43	40F3	A93A	1030	LDA	##3A
4073	8DAF22	0550	STA	\$22AF	40F5	8D4E23	1040	STA	\$234E
4076	8D5324	0560	STA	\$2453	40F8	A94D	1050	LDA	##4D
4079	A918	0570	LDA	##18	40FA	8D2324	1060	STA	\$2423
407B	8DDF0E	0580	STA	\$0EDF	40FD	8DC524	1070	STA	\$24C5
407E	8D0B0F	0590	STA	\$0F0B	4100	8DD224	1080	STA	\$24D2
4081	8D9B22	0600	STA	\$229B	4103	A94C	1090	LDA	##4C
4084	8DD830	0610	STA	\$30DB	4105	8D3124	1100	STA	\$2431
4087	A91C	0620	LDA	##1C	4108	8D4324	1110	STA	\$2443
4089	8D110F	0630	STA	\$0F11	410B	8D4E24	1120	STA	\$244E
408C	A924	0640	LDA	##24	410E	8D5924	1130	STA	\$2459
408E	8DC223	0650	STA	\$23C2	4111	8D6A24	1140	STA	\$246A
4091	A92E	0660	LDA	##2E	4114	8D8624	1150	STA	\$2486
4093	8DF824	0670	STA	\$24F8	4117	8DD524	1160	STA	\$24D5
4096	A923	0680	LDA	##23	411A	8DC52D	1170	STA	\$2DC5
4098	8DFA24	0690	STA	\$24FA					

411D	A9EA	1180	LDA	##EA		
411F	8D8A0D	1190	STA	\$0D8A		; THIS SECTION
4122	8D8B0D	1200	STA	\$0D8B		; MODIFIES THE VTOC
4125	A90E	1210	LDA	##0E		; FOR 60 FILENAMES
4127	8D9B0D	1220	STA	\$0D9B		
412A	A90F	1230	LDA	##0F		
412C	8D400F	1240	STA	\$0F40		
412F	A9BC	1250	LDA	##BC		
4131	8D620D	1260	STA	\$0D62		
4134	A000	1270	LDY	##0		

continued on page 31

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* Atari® DOS required
** Requires Maxi-DOS A® (available mid '83)
*** Requires Oasis® Software

continued from page 29

```

4136 B97641 1280 LOOP1 LDA MOD,Y ;CHANGES DUP.SYS
4139 993218 1290 STA $1832,Y ;TO dup.SYS
413C C8 1300 INY
413D C007 1310 CPY #7
413F D0F5 1320 BNE LOOP1
4141 A000 1365 LDY #0
4143 B95141 1370 LOOP2 LDA MSG,Y ;NEW MENU TITLE
4146 99101F 1380 STA $1F10,Y
4149 C8 1390 INY
414A C025 1400 CPY #37
414C D0F5 1410 BNE LOOP2
414E 4C0030 1415 JMP $3000 ;BACK TO DOS
4151 44 1420 MSG .BYTE "DOS 2.0S MOD. DIRECTORY W.NEWELL 6/82"

```

4152 4F	→ 415D 2E	→ 4168 20	→ 4173 2F
4153 53	415E 20	4169 57	4174 38
4154 20	415F 44	416A 2E	4175 32
4155 32	4160 49	416B 4E	4176 64
4156 2E	4161 52	416C 45	4177 75
4157 30	4162 45	416D 57	4178 70
4158 53	4163 43	416E 45	4179 2E
4159 20	4164 54	416F 4C	417A 53
415A 4D	4165 4F	4170 4C	417B 59
415B 4F	4166 52	4171 20	417C 53
415C 44	4167 59	4172 36	

```

0 POKE 82,2:POKE 83,39:GRAPHICS 0:POKE 752,1:POSITION 8,1:? "DISK DIRECTORY CONV
ERTER":? :?
5 DIM A$(1920),B$(1920),C$(1920),D$(32),IO$(5):IO$="h Sd'":D$=""
8 FOR I=1 TO 1889 STEP 32:C$(I)=D$:NEXT I:B$=C$:POKE 769,1:? "PRESS S
TART TO BEGIN"
10 IF PEEK(53279)<>6 THEN 10
20 N=0:GOSUB 200:A$=C$:CMD=82:BUF=ADR(B$):N=1:T=0
30 POKE 770,CMD:FOR S=105 TO 112:POKE 778,S:HI=INT(BUF/256):LO=BUF-HI*256:POKE 7
72,LO:POKE 773,HI
40 Z=USR(ADR(IO$)):IF PEEK(771)<>1 THEN 40
50 BUF=BUF+128:NEXT S
55 IF T=1 THEN ? "":? "PRESS START FOR ANOTHER DISK":GOTO 10
60 FOR I=1 TO 1009 STEP 16:IF ASC(B$(I,I))<128 AND ASC(B$(I,I))>0 THEN GOSUB 100
70 NEXT I:CMD=87:BUF=ADR(A$):T=1:GOTO 500
100 A$(N,N+12)=B$(I,I+12):A$(N+13,N+28)="
":A$(N+29,N+31)=B$(I+13
,I+15):N=N+32:RETURN
200 OPEN #1,6,0,"D:*.*)"
210 TRAP 230:N=N+1:INPUT #1;D$:IF N>60 THEN 300
220 GOTO 210
230 CLOSE #1:RETURN
300 CLOSE #1:POKE 752,0:? "))))))MORE THAN 60 FILES ARE ON THIS DISK!"
310 END
500 POKE 770,CMD:FOR S=105 TO 119:POKE 778,S:HI=INT(BUF/256):LO=BUF-HI*256:POKE
772,LO:POKE 773,HI
510 Z=USR(ADR(IO$)):IF PEEK(771)<>1 THEN 40
520 BUF=BUF+128:NEXT S
530 IF T=1 THEN ? "":? "PRESS START FOR ANOTHER DISK":GOTO 10

```

NOTE: D\$ IN LINE 5 SHOULD =32 HEARTS

NOTE: IO\$ IN LINE 5 SHOULD ='h,space,S,INVERTED d,DIAMOND'.



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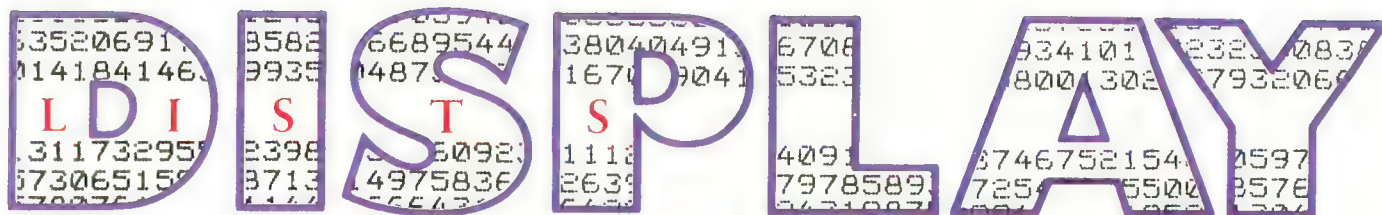


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simplified

by ALLAN E. MOOSE and MARIAN J. LORENZ

An important step in understanding your ATARI's graphics capabilities is to create your own custom display lists. This article will show you step-by-step how to mix text and graphics on your TV screen. Our method uses BASIC commands to modify Graphics Modes 0 through 8. BASIC sacrifices some of the ATARI's flexibility; however, these techniques will help you eventually create display lists in Assembly Language.

The graphics capabilities of the ATARI are controlled by a microprocessor chip called ANTIC (Alpha-Numeric Television Interface Circuit). Any display list is a *program* for ANTIC.

There is a display list program provided automatically by each BASIC graphics command, or you can define your own. The display list specifies where screen data is located, what display modes to use, and any special display options ANTIC is to implement. Since the display list describes the screen from top to bottom, any mix of graphics or text modes can be displayed on the screen.

To understand displays, you need to know a bit about television. In a TV, a beam of electrons is shot at the screen. The beam starts at the top left-hand corner and moves across the screen. When it reaches the right-hand side, the beam is turned off, returned to the left, and moved down slightly. It is then turned on again, and the process is repeated 262 times to form a completed screen image.

When the beam reaches the bottom right-hand corner of the screen, it is turned off and returned to the top left-hand corner to start over. These horizontal sweeps are called *scan lines* and are the basis of the display. The scan-line pattern actually starts above and ends below the physical boundaries of the TV screen. To assure that information is not displayed where you can't see it, the ATARI display usually is restricted to 192 scan lines, positioned in the middle of the screen.

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There are several other concepts you will need. These are:

ANTIC MODE NUMBER: ANTIC identifies modes with a set of numbers *different* from those used by BASIC. The ANTIC mode numbers corresponding to each BASIC Graphics Mode, 0 through 8, are listed in Table 2.

MODE LINE: A mode line is a grouping of scan lines into a fundamental unit for each Graphics Mode. For example, Graphics 8 uses one scan line per mode line; for Graphics 0 there are eight scan lines per mode line. Screen displays are made up of 192 scan lines grouped into mode lines (see Table 2).

LOAD MEMORY SCAN (LMS): The LMS number is the sum of the ANTIC mode number for the first mode line, plus 64. The LMS number has two functions. First, it tells ANTIC what mode will be used for the first mode line of the screen display. Second, LMS instructs ANTIC to take information from the screen memory area of RAM and display it. The next two bytes in the display list following the LMS number give ANTIC the starting address of the screen memory.

DISPLAY LIST POINTER: This is a variable that establishes the memory address for the first line of the display list. This address is found by the BASIC command: $PEEK(560) + PEEK(561) * 256$.

JUMP WHILE VERTICAL BLANK (JVB): This signals ANTIC that the end of the display list has been reached and it must loop back to the beginning. The jump is located immediately following the last mode line of your display list and is indicated by the decimal number 65. The low byte of the return address is given by $PEEK(560)$. The high byte of the return address is given by $PEEK(561)$.

RAM REQUIREMENTS: The Graphics Modes differ in the number of bytes that must be set aside in memory for screen data (see Table 1).

continued on next page

RAM BYTES PER MODE LINE: Just as the Graphics Modes differ in their total RAM needs, they differ in the number of bytes required per mode line (see Table 2). This information is important for synchronizing the Operating System (OS) and ANTIC.

DEVELOPING A CUSTOM DISPLAY LIST

STEP 1

Make a rough sketch of what you want to appear on the screen. Our example appears as Figure 1.

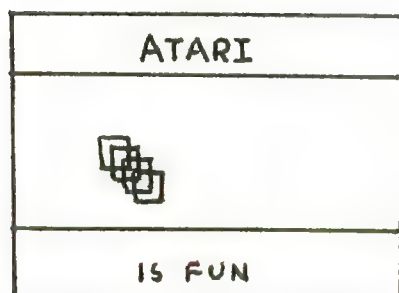
STEP 2

Select the Graphics Modes you want to use and the number of lines for each mode. Two requirements must be met. First, the total number of scan lines in all the mode lines should not exceed 192. If it does, the screen image may "roll." However, the total can be less than 192 with no adverse effect. Second, when you insert new mode lines into an existing display list, the total number of bytes required for the inserted lines must be a whole multiple of the bytes required per mode line in the existing display list. To understand this more fully, refer to Figure 2. Diagrams such as this are invaluable in planning a display list.

Our example will modify a Graphics 8 display list. Each line of Graphics 8 requires 40 bytes of RAM. Therefore, at the top we must insert at least two lines of Mode 2 (two lines \times 20 bytes) to match the 40 bytes per line of Mode 8. At the bottom we will insert four lines of Mode 1, each requiring ten bytes, for a total of 40 bytes.

Matching up the byte requirements between inserted lines and existing lines insures that the text and graphics will appear where we want them.

Figure 1



STEP 3

After choosing the modes you want, determine from Table 1 which of them requires the most RAM. Use this mode as your base (existing) mode, onto which you make changes that create your custom display list. This insures that the OS has set aside sufficient memory to hold your screen data. We have chosen Modes 2, 8 and 1. Mode 8 requires the most RAM, so it will be our base mode, called in line 30, but first we'll write a line to clear the screen and turn off the cursor:

```
20 ? CHR$(125):POKE 752,1
```

Next we call the display list to be modified. Adding 16 to GR. 8 eliminates the GR. 0 window that is a normal part of GR. 8.

```
30 GRAPHICS 8 + 16
```

We recommend that you enter the program as we go along. It will help you understand the process.

STEP 4

PEEK the display list pointer and assign it to a variable such as "DL".

```
40 DL = PEEK(560) + PEEK(561)*256 + 4
```

The number 4 is added to the display list pointer for insurance. Recall that the TV generates scan lines that do not appear on the screen. To allow for this, BASIC Graphics Modes generate 24 blank scan lines at the start of the display list. Adding 4 to the display list pointer will make sure that we don't inadvertently remove any of these lines.

STEP 5

POKE the LMS instruction into DL-1. The value 71 derives from ANTIC mode number 7, plus 64. This instruction will establish the first mode line of the display list. If

Figure 2

RAM Bytes / Mode		Scanlines
$2 \times 20 = 40$	GRAPHICS MODE 2 (2 lines)	$2 \times 16 = 32$
$40 \times 128 = 5120$	GRAPHICS MODE 8 (128 lines)	$128 \times 1 = 128$
$4 \times 10 = 40$	GRAPHICS MODE 1 (4 lines)	$4 \times 8 = 32$
		TOTAL 192


```

13174159475651766705554553182694695708607612657559814077070659
42111565981812436527859435986353366348550989531-1572393089444
06352069176685824066095445638040491566708044380793410179832304594
40141841463399351048738376416706904185323201707080013029379320661

```

your first mode line belongs to your base mode, skip this step:

50 POKE DL-1,71

STEP 6

Every mode line in your diagram requires a statement in your display list. Write these in the same order as they appear on the screen, and POKE the ANTIC mode numbers as appropriate. This is the second line of our Graphics Mode 2.

60 POKE DL + 2,7

From the diagram we can see that the next 128 lines are Graphics 8. Since this is our base mode, these lines already exist in the display list. The next mode lines to insert are the four Graphics 1 lines at the bottom.

70 POKE DL + 132,6
80 POKE DL + 133,6
90 POKE DL + 134,6
100 POKE DL + 135,6

STEP 7

End the display list with a JVB, followed by the low byte and high byte of the return address:

110 POKE DL + 136,65
120 POKE DL + 137,PEEK(560)
130 POKE DL + 138,PEEK(561)
140 GOTO 140

Now RUN the program. You will see the top section (GR.2) black, the bottom section (GR.1) black, and the middle section (GR.8) blue. To make the middle section black, change line 30 to:

30 GRAPHICS 8 + 16:SETCOLOR 2,0,0

Table 3 shows the relevant portions of our display list and demonstrates another important point. Line 30 of our program has stored the LMS instruction in Address 32825. Line 40 stores the value 7 in Address 32828 to give us the second mode line of Graphics 2. Instructions for the Graphics 1 lines and JVB are stored in Addresses 32958 through 32962.

Look at Addresses 32921 through 32923. Note that here in the middle of the display list is another LMS instruction followed by a screen memory address! The reason is that ANTIC cannot address a block of memory longer than 4K bytes. Since Graphics 8 requires 8K bytes, the screen memory must be broken up into two blocks. ANTIC is sent to the first block of screen memory by the first LMS instruction in Address 32825, and is sent to the second block of screen memory by the second LMS instruction in Address

32921. "Jumping the 4K boundary," occurs only for Graphics 8.

You must be careful of two things when you modify a Graphics 8 display list. First, don't clobber the second LMS instruction and the two following bytes by putting mode lines in their place. Second, you must calculate an offset if you change modes after the boundary jump. We did this in line 70, by adding two lines to the display list (DL + 132 vs. DL + 130).

At this point the actual display is written into screen memory. The next task will be to print "ATARI" in the Graphics 2 section. Line 10 established GR.8 and instructed the OS that data in screen memory is to be interpreted as graphics, not text. Consequently if we simply enter PRINT #6: "ATARI", the OS will not carry out the command. The OS must be told how to interpret the data it finds in screen memory by POKEing the appropriate Graphics Mode number into memory address 87.

140 POKE 87,2
150 POSITION 8,0:PRINT #6: "ATARI"

The OS positions text or graphics on the screen by counting bytes from the start of the screen memory associated with the Graphics Mode value stored in location 87. Thus, it is possible for total screen memory to be considerably longer than the memory for the mode the OS is using. This disparity can cause "cursor out of range" error messages and trouble positioning material on the screen.

The cure for both problems is fairly simple. Before creating a display on the screen, change the start of the screen memory to coincide with the start of the mode section where you want the display to appear. For the Graphics Mode 8 section this will eliminate the trial-and-error method of placement. For the Graphics Mode 1 section this will prevent a "cursor out of range" message.

To write our display we start with:

160 POKE 87,8

to tell the OS what mode we're in. Then locate the current top of the screen address with:

170 TPSCRN = PEEK(88) + PEEK(89)*256

Next, offset the variable TPSCRN by the number of bytes in the Mode 2 lines + 1 (four Mode 2 lines × ten bytes per line = 40 bytes):

180 TPSCRN = TPSCRN + 41

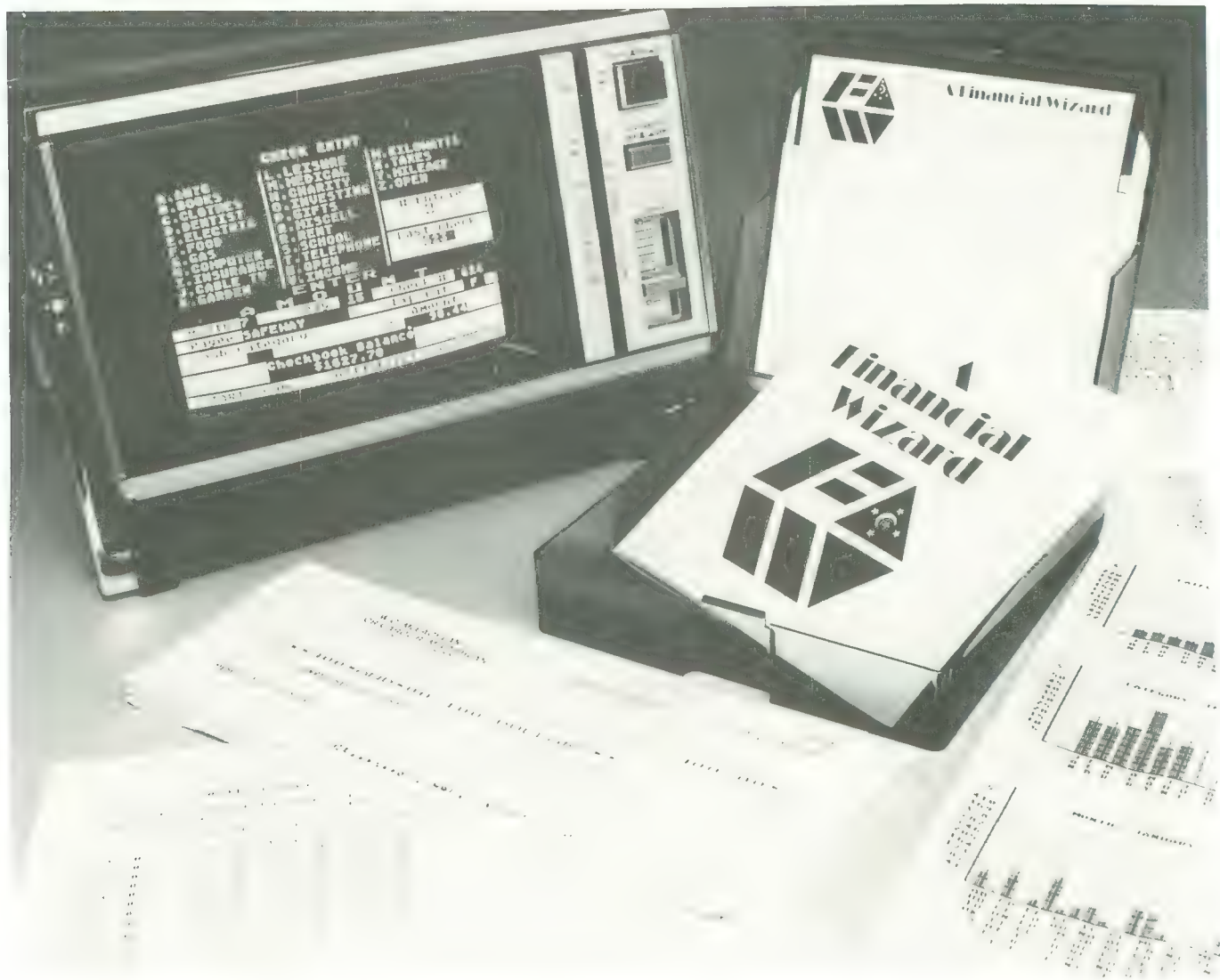
Finally, POKE this memory location back into 88 (low byte) and 89 (high byte):

190 POKE 88,TPSCRN-(INT(TPSCRN/256)*256)
200 POKE 89,INT(TPSCRN/256)

This procedure sets up the Graphics 8 section of our display so that the top left hand corner corresponds to posi-

continued on page 37

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DISPLAY LISTS SIMPLIFIED *continued from page 35*

place your display components.

```
210 COLOR 1:FOR I=1 TO 40 STEP 5
220 PLOT 60+I,40+I:DRAWTO100+I,40+I:
    DRAWTO 100+I,80+I:DRAWTO 60+I,80+I:
    DRAWTO 60+I,40+I
230 NEXT I
```

Finally, print "IS FUN" in the Mode 1 section at the bottom of the screen.

```
240 POKE 87,1
250 TPSCRN = TPSCRN + 5121
```

Line 250 offsets TPSCRN to the beginning of the Mode 1 section. 5121 is obtained from (128 lines of Gr. 8) * (40 bytes per line) = (5120 bytes) + 1.

```
260 POKE 88,TPSCRN-(INT(TPSCRN/256)*256)
270 POKE 89,INT(TPSCRN/256)
280 POSITION 6,2:?"#6; "IS FUN"
290 GOTO 290
```

Table 1

GRAPHICS MODE RAM REQUIREMENTS

MODE	BYTES	MODE	BYTES
8 + 16	8138	4 + 16	696
8	8112	4	694
7 + 16	4200	3 + 16	432
7	4190	3	434
6 + 16	2184	2 + 16	420
6	2174	2	424
5 + 16	1176	1 + 16	672
5	1174	1	674
		0	992

Table 2

BASIC MODE NUMBER	ANTIC NUMBER	TYPE	LMS BYTE	# OF MODE LINES	SCAN LINES/ MODE LINE	RAM BYTES/ MODE LINE
0	2	text	66	24	8	40
1	6	text	70	24	8	20
2	7	text	71	12	16	20
3	8	graphics	72	24	8	10
4	9	graphics	73	48	4	10
5	10	graphics	74	48	4	20
6	11	graphics	75	96	2	20
7	13	graphics	77	96	2	40
8	15	graphics	79	192	1	40

continued on next page

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13174159475651766705554553182694695383607613687558264977970455112
 42111385961812436527059432906313365340590923316237359308946097E34
 06352309176685824068154456380404915667080443001934101792323008384
 401418414633993510487383764167069041853232017070800130293793206611

ADDRESS	OUR LABEL	VALUE	MEANS	
32822	DL-4	112	Blank scan lines provide for "overscan"	Table 3
23	DL-3	112		
24	DL-2	112		
25	DL-1	71	LMS — 64 + 7 sets ANTIC mode 7 and one line of same gives address of start of screen memory	
26	DL	80		
27	DL + 1	129	LO-Byte + HI-Byte * 256 = 33104	
28	DL + 2	7	sets ANTIC 7 for second mode line (equiv. of GR.2)	
32829	DL + 3	15	reverts to	
32921	DL + 95	79	ANTIC mode 15	} LMS and address for 4K boundary jump, includes one line of mode 15
22	DL + 96	0	for 128	
23	DL + 97	144	mode lines	
32924	DL + 98	15	(equivalent	
.	.	.	of GR.8)	
32957	DL + 131	15		
32958	DL + 132	6	sets ANTIC mode 6 for four lines	
59	DL + 133	6		
60	DL + 134	6	(equivalent of GR.1)	
61	DL + 135	6		
62	DL + 136	65	JVB to address given by next two bytes	
63	DL + 137	54	LO-Byte of return address	
32964	DL + 138	128	128 * 256 = 32768, HI-Byte of return address	
			+ 54	
			32822 = return address	

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Created by Mike White and Evan Rosen (co-author of valFORTH 1.1)

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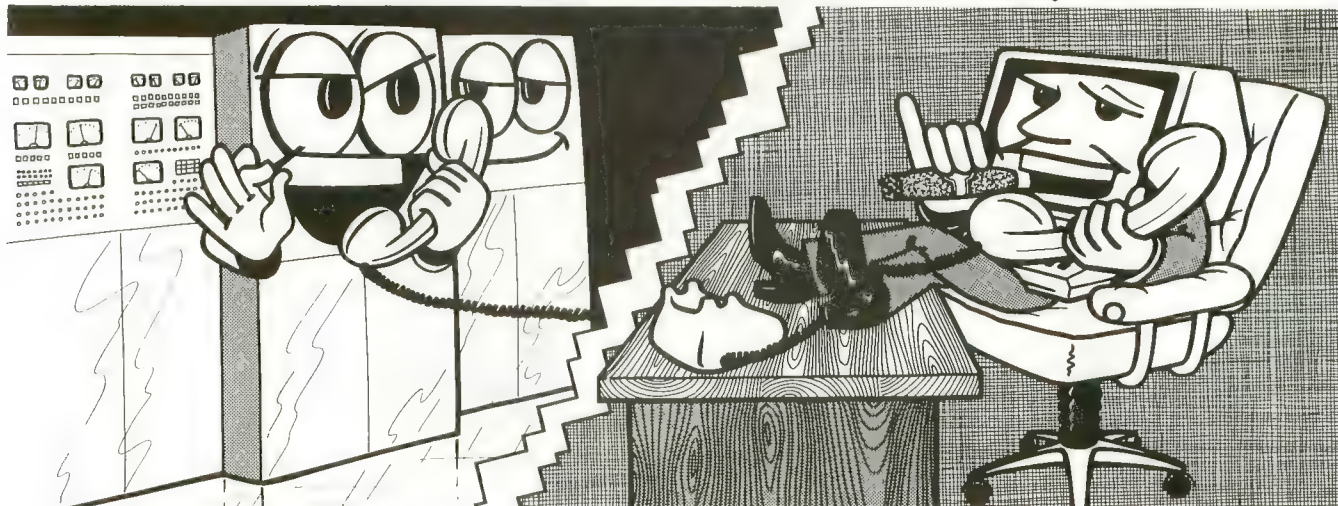


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REFRESHER

Last time we asked you to write a program to compute the WORD'S WORTH of a string of letters (WORDS\$). We assigned letter scores (LS) to letters (L\$), as follows.

A = 1 B = 2 C = 3 D = 4 E = 5 F = 6
 G = 7 H = 8 I = 9 J = 10 K = 11 L = 12
 M = 13 N = 14 O = 15 P = 16 Q = 17 R = 18
 S = 19 T = 20 U = 21 V = 22 W = 23 X = 24
 Y = 25 Z = 26

A WORD'S WORTH (WW) is the sum of the letter scores in a word, or in any string of letters. HOBBIT is worth 56, DRAGON is worth 59, and WIZARD is worth 81.

Let's write a program to compute a Word's Worth. A RUN might go like this.

YOUR WORD? WIZARD
 YOUR WORD IS WORTH 81 POINTS

YOUR WORD? ISN'T
 YOUR WORD IS WORTH 62 POINTS
Ignore apostrophe (')

YOUR WORD? FLIP-FLOP
 YOUR WORD IS WORTH 92 POINTS
Ignore hyphen (-)

YOUR WORD? ONE HUNDRED
 YOUR WORD IS WORTH 108 POINTS
Ignore space

YOUR WORD? 3#AB%*Z
 YOUR WORD IS WORTH 29 POINTS
Ignore everything except letters

YOUR WORD? 123
 YOUR WORD IS WORTH 0 POINTS
No letters, so no points.

YOUR WORD? and so on . . .

Our program should compute the worth of any word or even any string of letters, even if it isn't a word.

Here is our program for WORD'S WORTH #1.

```

100 REM ** WORD'S WORTH #1
110 DIM WORD$(50), LS(1)
120 GR. 0

200 REM ** ASK FOR A WORD
210 PRINT: PRINT "YOUR WORD";
220 INPUT WORD$

300 REM ** COMPUTE LENGTH OF WORD
310 WL = LEN(WORD$)

400 REM ** START WORD'S WORTH AT ZERO
410 WW = 0

500 REM ** COMPUTE WORD'S WORTH
510 FOR L = 1 TO WL
520   L$ = WORD$(L,L)
530   IF L$ < "A" THEN 570
540   IF L$ > "Z" THEN 570
550   LS = ASC(L$) - 64
560   WW = WW + LS
570 NEXT L

600 REM ** PRINT THE WORD'S WORTH
610 PRINT "YOUR WORD IS WORTH"; WW;
   "POINTS"

700 REM ** GO FOR ANOTHER WORD
710 GOTO 210
  
```

This program is written in *blocks*. Each block begins with a
continued on page 43

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REM statement with a line number that is a multiple of 100. So, we have block 100, block 200, block 300, and so on. Most of the work is done by block 500.

Block 500 tells the computer to look at each character in the value of WORD\$, beginning at the left. These characters are assigned, one at a time, to L\$ (line 520). If a character is *not* a letter, lines 530 and 540 tell the computer to skip over lines 550 and 560.

Now suppose the value of L\$ is a letter, A to Z. Line 550 computes the letter score (LS) of the letter, 1 for A, 2 for B, and so on. Line 560 adds this value to the Word's Worth (WW).

There is always another way. Here is another way to write block 500.

```
500 REM ** COMPUTE WORD'S WORTH
510 FOR L=1 TO WL
520   L$ = WORD$(L,L)
530   IF ASC(L$) < 65 THEN 570
540   IF ASC(L$) > 90 THEN 570
550   LS = ASC(L$) - 64
560   WW = WW + LS
570 NEXT L
```

And yet another way:

```
500 REM ** COMPUTE WORD'S WORTH
510 FOR L=1 TO WL
520   L$ = WORD$(L,L)
530   LX = ASC(L$)
540   IF LX < 65 OR LX > 90 THEN 570
550   LS = LX - 64
560   WW = WW + LS
570 NEXT L
```

And yet other ways may be incubating in your imagination.

WORD'S WORTH #2

Of course you have probably expected that WORD'S WORTH #1 must be followed by WORD'S WORTH #2. Your turn. Modify WORD'S WORTH #1 so the Word's Worth is the product of the letter scores. For example:

WIZARD is worth $23*9*26*1*18*4 = 387,504$ points

ISN'T is worth $9*19*14*20 = 47,880$ points

ABC is worth $1*2*3 = 6$ points

Begin your program like this.

```
100 REM ** WORD'S WORTH #2
```

The rest is up to you. We think you will have to change only two lines in our program for WW #1.

Now we will ask you a bunch of questions. To answer any question, you must find a word in a dictionary. Oh oh —

too many dictionaries! To make things the same for everyone, let's all use the same dictionary. We choose the abridged *American Heritage* dictionary. It has 55,000 words. That should be enough for our wordy escapades. You can buy a copy for \$3.95 at most any bookstore.

Yes, you people with 10, 20, or 30 pound dictionaries may also respond. Please tell us *what* dictionary you used, including most recent copyright date. If you come up with something interesting, we might take your word for it and mention your answer.

OK, with *American Heritage* abridged dictionary in hand, try one or more of these questions.

1. Can you find a word worth exactly 100? Exactly 1000? Exactly 10000? Exactly 100000? Exactly 1000000?
2. In case you are snowbound for a few weeks, try this one. How many three-letter words have a Word's Worth #2 less than 100? How can you use your ATARI to help find out?
3. What three-letter word has the smallest Word's Worth #2?
4. What three-letter word has the largest Word's Worth #2?
5. In the dictionary we selected, what word has the largest Word's Worth?
6. What is the most *interesting* three letter word? By most "interesting," we mean what word, together with its Word's Worth, is most interesting?

SCRABBLE SCORES

In SCRABBLE, each letter has a letter score (LS), as follows.

A = 1	B = 2	C = 3	D = 2	E = 1	F = 4
G = 2	H = 4	I = 1	J = 8	K = 5	L = 1
M = 3	N = 1	O = 1	P = 3	Q = 10	R = 1
S = 1	T = 1	U = 1	V = 4	W = 4	X = 8
Y = 4	Z = 10				

Write a program to compute the Scrabble score of a word, or any string of letters. Ignore anything that is not a letter. A RUN of your program might go like this.

```
YOUR WORD? CAT
THE SCRABBLE SCORE IS 5
```

```
YOUR WORD? ISN'T
THE SCRABBLE SCORE IS 4
Ignore apostrophe
```

```
YOUR WORD? AZTEC
THE SCRABBLE SCORE IS 16
```

continued on next page

DRAGON SMOKE

YOUR WORD? 12%3#
THE SCRABBLE SCORE IS 0
Only letters count!

YOUR WORD? . . . and so on

NEXT TIME

Next issue, we will show you our programs for WORD'S WORTH #2 and SCRABBLE SCORES. In the meantime, if you want to reach us, write to: George and Bob, P.O. Box 310, Menlo Park, CA 94025. If you want a reply, enclose a self-addressed, stamped envelope.



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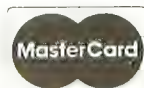
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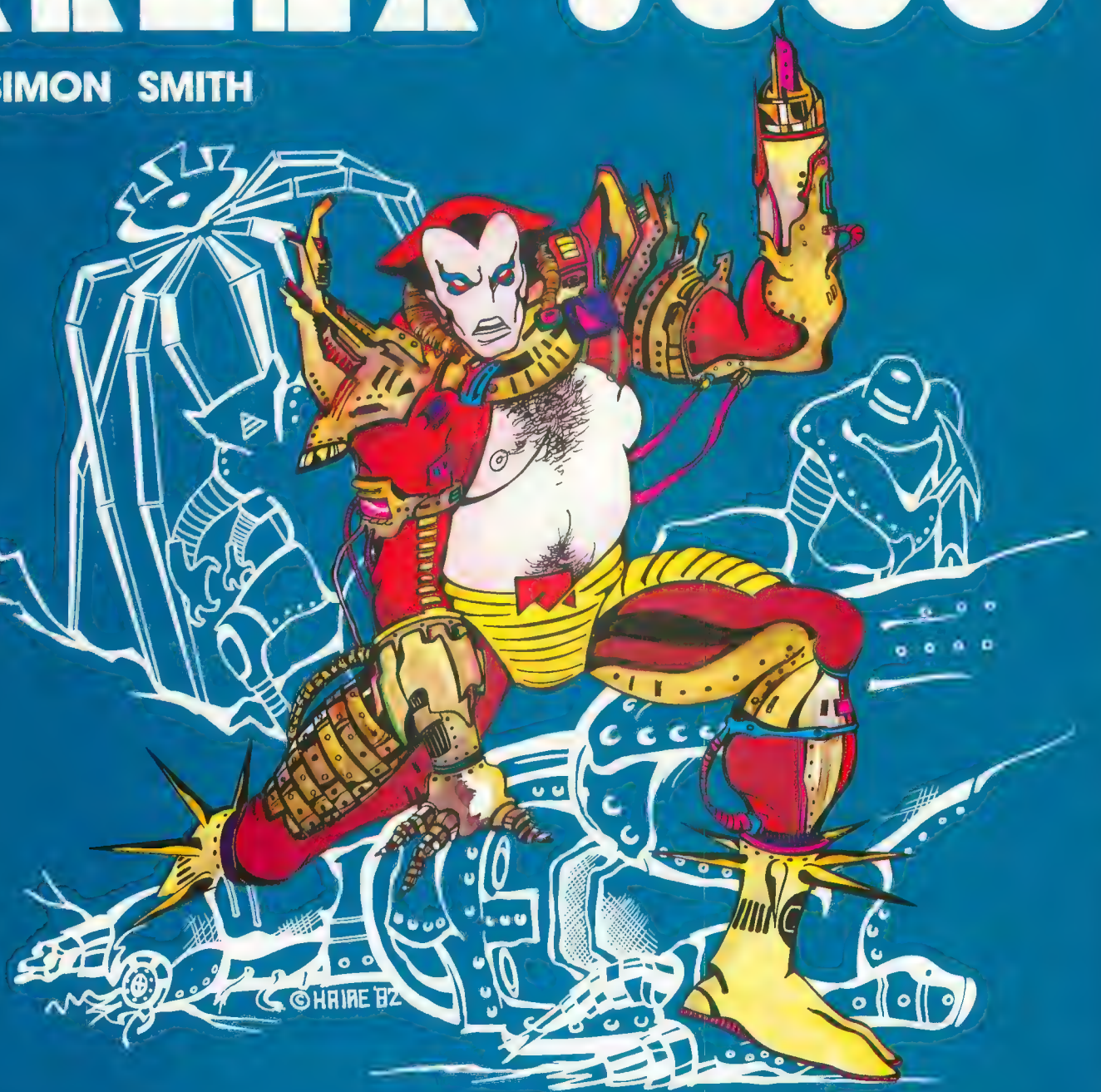
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BY SIMON SMITH



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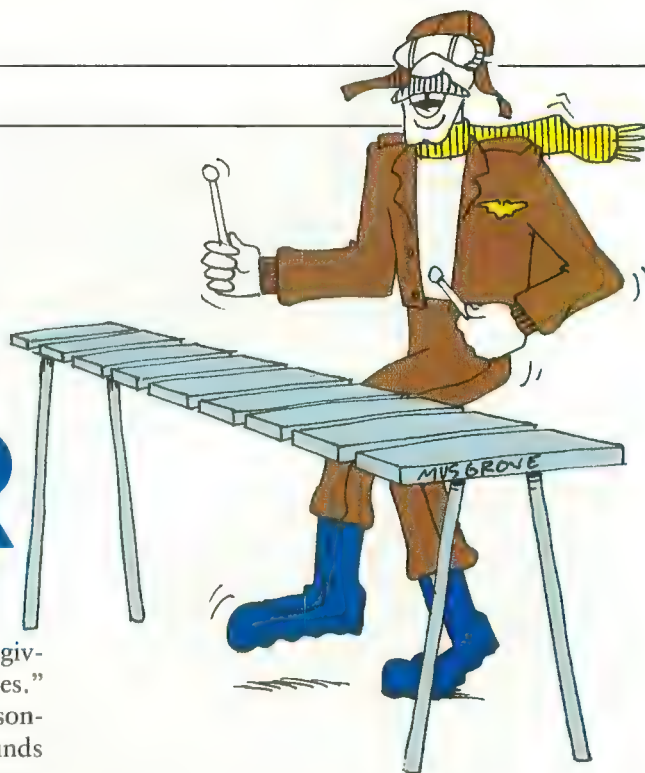
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SOUNDER

by KEN HARMS



Atari PILOT was designed as an easy-to-use language giving "reasonable control of the machines' capabilities." PILOT's SO:und command, however, isn't very reasonable. This article will show you how to get the great sounds ATARI can produce in spite of PILOT. We'll also generate a good random number (PILOT's is almost useless for most purposes), produce animated character graphics, use the joystick to move large cursors, and give you a start on translating BASIC sound effects to PILOT modules.

The ATARI hardware system is the consummate sound computer. Even BASIC lets you use only a small fraction of the hardware's ability. Normal PILOT lets you use almost none. But, with special C:ompute commands, PILOT can give you everything BASIC can. That special command is "Compute at byte" or, in PILOT, C:@Bxxx. The "xxx" refers to the "address" of a "byte" (or character) of memory. The ATARI uses values in certain "addresses" to turn sounds on or off, set margins, etc. For instance, to tell ATARI that the left margin should be at column 3, we issue a C:@B82 = 3.

Under PILOT, the SO:und command controls only the frequency (pitch) of each voice. The distortion and loudness are set to give a clear, bell-like tone. However, two registers are available to control each of the four voices' pitch and distortion/loudness. The addresses of these registers are:

Function	Voice 0	Voice 1	Voice 2	Voice 3
Pitch	53760	53762	53764	53766
Control	53761	53763	53765	53767

Numbers used in the pitch register are different from PILOT's SO:und command. They are especially confusing because larger numbers in the pitch register produce lower tones (opposite of normal PILOT). Luckily for translators, the pitch numbers are the same as BASIC's sound command.

The real fun starts with the control register. ATARI cleverly uses these values to control both the loudness and distortion of the voices. Different distortion values produce

machine guns, laser swords, locomotives, and many other special sounds.

Loudness values run from 0 to 15 (16 values). Distortion values occur every 32 points from 0 to 224 (8 values). To get numbers for the control register, simply add the distortion and loudness numbers you want, and assign them to the appropriate control register with a C:@Bxxx command. (See your BASIC manual for more information on distortion and loudness.) The table below gives the BASIC SOUND command values for each distortion number:

BASIC DISTORTION NUMBER	0	2	4	6	8	10	14
CONTROL REGISTER VALUES	0	32	64	128	160	192	224

So, to produce a sound at pitch 100 with loudness 8 (medium) in distortion 4 for voice 0, execute the following instructions:

```
C:@B53760 = 100
C:@B53761 = 8 + 64
```

You could wear out several keyboards typing the various combinations to test them out. To help you pilot your way through sounds, I've included PILOT SOUNDER. It's really much easier to type than it looks, since over half of it repeats and the AUTO command makes it almost automatic. Just type through line 700, then up-cursor to 610, change the *FVOICE0 to *FVOICE1, return, change #Qs to #Ss, etc., through all the FVOICES. Remember to change the C:@B values on the 80 lines. Then do the same for the CVOICES. You'll have hours of fun planning sounds for your next PILOT program, or just sounding off — my kinds love it!

PILOT SOUNDER displays all eight registers and shows

continued on page 52

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PILOT YOUR ATARI

actions between the registers.

Lines 240 and 250 C:ompute values for the trigger (%T8 = 1 if pressed, 0 if not) and the position of the joystick (%J0 — see PILOT Primer, appendix D). I move them into numeric variables so that the values don't change as we proceed through the program. If the trigger is pressed, *CURSORMOVE blanks the old cursor (line 330), calculates the new position, and prints a new cursor (lines 460-470).

If the trigger was not pressed, *VALUECHANGE calculates a new value for the register where the cursor is. This is tricky. The A:cept in line 520 puts the row value into the accept register where it's M:atched against line 530. If the cursor is in column #2 (pitches), line 540 jumps to a frequency (pitch) calculator for voice 0, 1, 2, or 3, depending on the match. Line 570 does the same thing for control values if the cursor was in column 3. See the PILOT Primer, pages 64 and 65 for more data on the JM: command. The *CVOICE modules use a little modulo math to calculate the distortion and loudness values stored in each register. They then call *FACTOR which increases or decreases these values based on the joystick position. Note that loudness values between 16 and 32, inclusive, are not allowed — in essence, we're using a base 16 (hexadecimal) counting system.

Now look at that long condition in line 210. When you ADD conditions, it's the same as "or-ing" them. That line says "if J0 = 0 or if J0 = 5 or if J0 = 6 or if J0 = 10 (any one of them) J:ump to *SENSE. Multiplying conditions [(J0 = 0) * (J0 = 5). . .] ANDs them and requires all to be true before the statement is executed.

SPECIAL EFFECTS presents a few simple sounds and graphics. Jackhammer was inspired by the *ATARI Connection*, Volume 1, Number 2 (which has 10 other neat sounds for ambulances, etc., in BASIC). Jackhammer C:omputes address 84 to set the cursor on row 8 and then address 82 to set the left margin on column 14. If the margin hadn't been changed, you'd have to use a POS:ition command before each T:ype command in *PICTURE — a lot of work! The neatest trick occurs on lines 1110 and 1150 which uses one of ATARI's many internal clocks to generate a semi-random number to control the length of the PA:use. The random number generated by the ? is just too big (+32768 to -32768) for most purposes. Address 20 always contains a number between 255 and 0 — and counts down every 60th of a second. Interestingly, the sound registers (and many other locations) are "read-only" registers which also contain random numbers between 0 and 255. They are even better for this purpose since they are more random than the count-down clock in address 20.

Jackhammer illustrates a simple counter to replace BASIC's FOR / NEXT loop. Here's how the two languages compare:

BASIC
For Z = 0 to 15
 program . . .
Next Z
 more program

PILOT
C:#Z = 0
*LOOPNAME
 program . . .
C:#Z = #Z + 1
E(#Z = 15):
J:*LOOPNAME
 more program

PILOT uses more lines. It also runs much faster than BASIC — you'll probably have to slow down the BASIC routines you code.

The *BOUNCING BALL and *LIGHTNING modules were translated from Jerry White's excellent MUSIC LESSONS (available from Swifty Software — the package is jam-packed, two-sided disk in BASIC with many more special effects, player pianos, etc., in a tutorial format).

The ball translation shows how to handle non-integer loops (i.e., a FOR / NEXT loop using steps or values which are not whole numbers). I just multiplied them up to integers, as well as all values used for pitches, etc. Here's how it was done:

BASIC
For Y = 22 to 20 Step -0.5
 program
NEXT Y

PILOT
C:#Y = 22*2
*BALL 1
 program
C:#Y = #Y + 1
J(#Y > 20):*BALL 1
E:

Since there are 24 steps of 0.5 between 22 and 10, and 24 steps of 1 between 44 and 20, the loops are equivalent.

Throughout SPECIAL EFFECTS, I used numeric variables for register addresses rather than type them in each time (see *REGISTERS).

Another good source for special effects is Educational Software's TRICKY TUTORIAL #10 which codes about 50! As always, the most satisfying source is your imagination . . . assisted by PILOT SOUNDER!

listing on page 93

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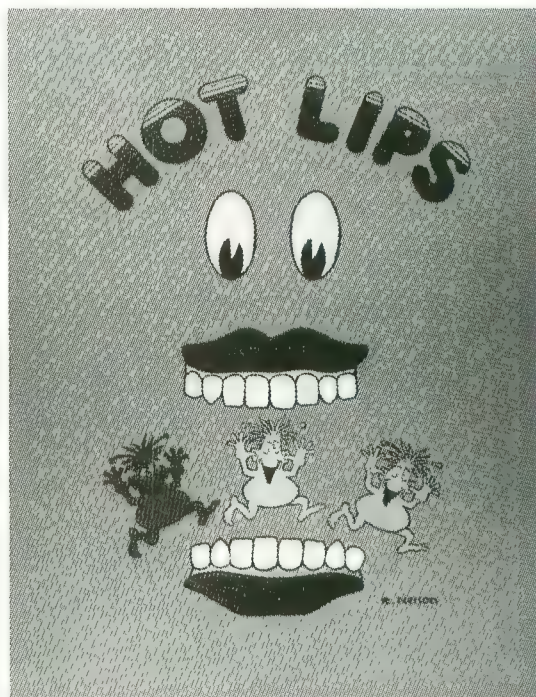
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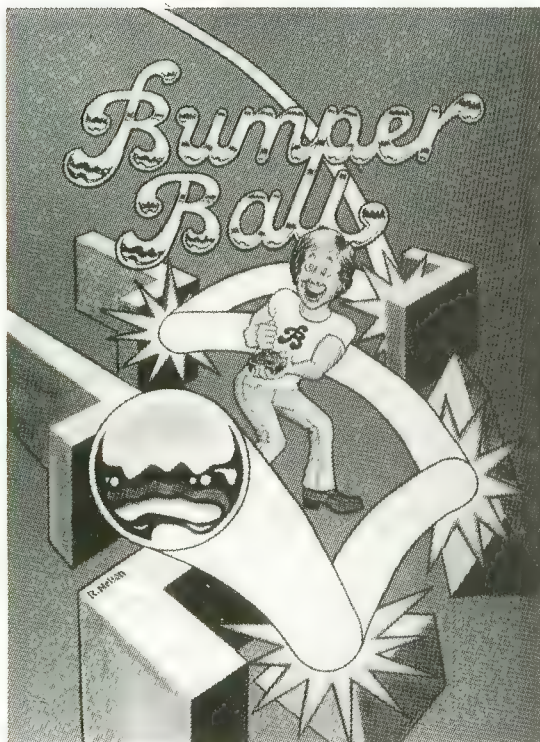
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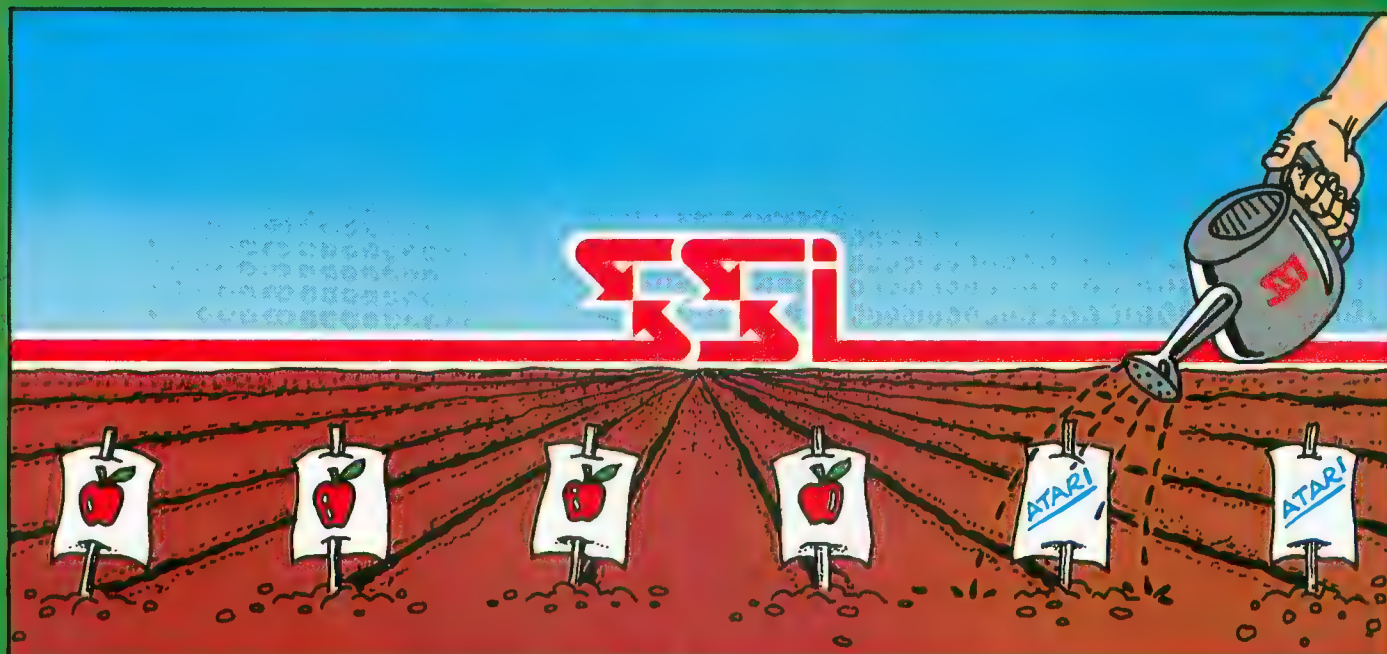
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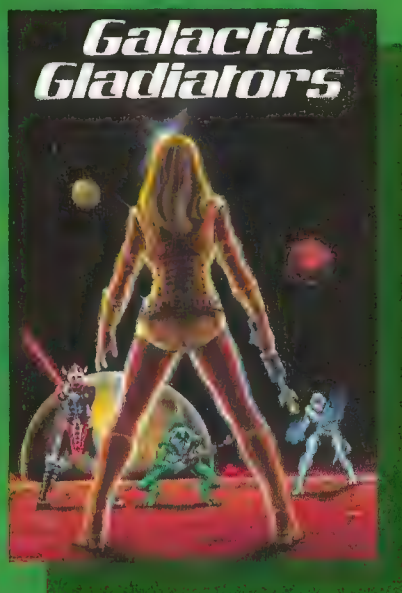


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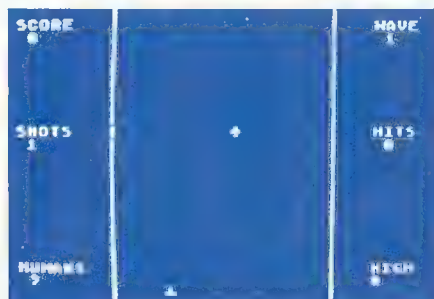
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STELLAR DEFENSE



by MIKE COLVIN

You have to be quick to shoot these invaders as they zig and zag down from the top of the screen. You can move your gun laterally with the joystick and fire with the button from your supply of 75 rounds. You score points for each attacker you hit, and lose a player if the attacker hits you. At the end of each wave your score is enhanced by the number of players you have left. Each game supplies four players, and an additional player is awarded after each wave is completed.

This game was written by Mike Colvin, a high school student in Sacramento, CA, who polished up his early version with the helpful suggestions of Jerry White, our Technical Consultant. It is gratifying to see the development of the several new programmers who have submitted games for this department, even when those programs have not been quite ready for publication. Keep hacking, gang.

```

0 REM STELLAR MODIFIED BY
  JERRY WHITE 8/31/82
1 REM REDEFINED CHARACTER
  SET RECOMMENDED.
10 GOTO 2000
20 FOR W=20 TO 1 STEP -1:S
  T=0:POSITION A,W+1: CH
  R$(32):SOUND 0,1,2,8:PO
  SITION A,W: CH R$(124);
24 IF A=Q AND W=B THEN SOU
  ND 0,0,0,0:POSITION A,W
  : CH R$(32):POP :POP :
  GOTO 400:REM invader ha
  s been hit
26 SOUND 0,0,0,0:NEXT W:SQ
  =0:RETURN
100 POKE 752,1:POSITION 1,9
  : CH R$(32):POSITION 2,
  10: CH R$(32): SHOTS: CH R$(32)
105 POSITION 1,1: CH R$(32): "SCORE":
  POSITION 2,2: CH R$(32): SCORE
106 POSITION 33,1: CH R$(32): "WAVE"
107 POSITION 34,2: CH R$(32): WAVE
108 POSITION 33,9: CH R$(32): "HITS":
  POSITION 34,10: CH R$(32): HITS
110 F$=""
  IF F$="I":REM Type SHIFT-KEY
  = ,19 spaces,SHIFT-KEY
  =
120 FOR X=0 TO 23:POSITION
  9,X: CH R$(32):NEXT X
130 A=15:POKE 559,34:SETCOL
  OR 1,0,14
139 REM main loop
140 Q=INT(RND(0)*33)
150 IF Q<=12 THEN Q=13
160 IF Q>28 THEN Q=28
174 FOR B=1 TO 22:POSITION
  Q,B-1: CH R$(32):Q10=IN
  T(RND(0)*51):SOUND 0,96
  ,10,8
177 IF Q10<=20 THEN Q=Q-1:IF
  Q<=12 THEN Q=12
179 IF Q10>=30 THEN Q=Q+1:IF
  Q>=28 THEN Q=27
180 POSITION Q,B: CH R$(16)
182 POSITION Q,B-1: CH R$(32)
185 IF ST>8 AND ST<15 THEN
  POSITION A,22: CH R$(32)
  : A=A-1
186 IF ST>4 AND ST<9 THEN P
  OSITION A,22: CH R$(32)
  : A=A+1
187 IF A<11 THEN A=11
188 IF A=29 THEN A=28
190 ST=STICK(0):SQ=STRIG(0)
  :POSITION A,22: CH R$(24)
213 IF B=21 THEN GOSUB 450
214 IF SQ=0 THEN GOTO 250
215 SOUND 0,210,10,8:NEXT B
250 SQ=1:SHOTS=SHOTS+1:IF S
  HOTS>75 THEN GOTO 800
251 POSITION 2,10: CH R$(32):
  GOSUB 20:REM shoot miss
  ile
281 IF SHOTS=75 THEN GOTO 8
  00
282 POSITION A,W+1: CH R$(32)
283 SOUND 0,0,0,0
285 NEXT B:REM returns to m
  ain loop
290 SQ=1
300 IF SHOTS=75 THEN GOTO 8
  00
310 GOTO 140
399 REM invader hit; explos
  ion
400 ST=0:Q=0:S=(20-W)*10+10
  0
401 HITS=HITS+1:POSITION 34
  ,10: CH R$(32): HITS:SCORE=SCORE+
  S
403 POSITION A-1,B: CH R$(32)
404 FOR Y10=1 TO 25:SETCOLO
  R 1,Y10,4:SETCOLOR 2,Y1
  0,4:SETCOLOR 4,Y10,8:SE
  TCOLOR 1,0,14:NEXT Y10:
  SETCOLOR 2,0,0
405 FOR W=0 TO 120 STEP 10:
  SOUND 0,W,0,15-W/17:SOU
  ND 1,128+W/2,B,8+7*RND(
  1):NEXT W:SOUND 1,0,0,0
406 POSITION A-1,B: CH R$(32)
  : B=0
410 POSITION 2,2: CH R$(32): SCORE: CH R$(32)
420 SQ=1:IF HITS=YP THEN GO
  SUB 600
425 IF SHOTS=75 THEN SOUND
  0,0,0,0:GOTO 800

```

continued on page 59

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continued from page 57

```

430 SOUND 0,0,0,0:GOTO 140
449 REM invader has reached
    the bottom
450 FOR B=21 TO 1 STEP -1
460 POSITION 0,B:CHR$(16)
480 POSITION 0,B:CHR$(32)
490 POSITION 0,B+1:CHR$(32)
496 SOUND 0,B*10,2,8
500 NEXT B:SQ=1
501 SOUND 0,0,0,0
505 Q=Q+1:IF Q=28 THEN Q=14
506 H=H-1:IF H=0 THEN GOSUB
    800
507 POSITION 2,21:IF H:IF "
    "
508 FOR OL=10 TO 210:SOUND
    0,OL,14,8:NEXT OL
510 SOUND 0,0,0,0:RETURN
599 REM end of attack wave
600 ? ">":SETCOLOR 1,0,0:SE
    TCOLOR 2,0,14:SETCOLOR
    4,0,0:POKE 752,1
610 POSITION 12,5:IF "ATTACK
    WAVE ";;? WAVE:POSITIO
    N 13,6:IF " COMPLETED"
620 BONUS=H*WAVE*HITS*10:PO
    SITION 13,8:IF "BONUS "
    :IF BONUS:SCORE=SCORE+B
    NUS
625 IF WAVE>0 THEN H=H+1
630 GOSUB 900
635 WAVE=WAVE+1:SOUND 0,0,0
    ,0:G=0
636 IF WAVE>0 THEN POSITION
    13,15:IF "FREE HUMAN"
637 IF WAVE>0 THEN FOR TU=1
    TO 15:SOUND 0,35,12,8:
    FOR TI=1 TO 10:NEXT TI:
    SOUND 0,0,0,0:NEXT TU

638 SHOTS=0:HITS=0:GOTO 201
    0
700 GRAPHICS 0:SETCOLOR 2,0
    ,8:SETCOLOR 1,0,0:POKE
    752,1
710 ? :? " THE OBJECT TO
    THIS GAME IS TO TRY T
    O HIT AS MANY INVADERS
    AS POSSIBLE."?:?
730 ? " AT THE END OF EACH
    WAVE YOU GET BONUS POIN
    TS ACCORDING TO THE # O
    F HUMANS YOU HAVE LEF
    T."
740 ? :? " YOU GET AN EXTRA
    HUMAN AFTER EVERY W
    AVE."?:? :? "
    GOOD LUCK!!!"
750 ? :? :? " "
    :CHR$(16):"=? points"
751 ? :? :? "YOU ONLY HAVE
    75 SHOTS A WAVE SO MAKE
    THEM COUNT."?:? :? "PRE
    SS THE FIRE BUTTON TO S
    TART!!!"
760 IF STRIG(0)<>0 THEN 760
761 GOTO 2008
799 REM end of game
800 IF SCORE>HIGH THEN HIGH
    =SCORE
805 GRAPHICS 18:SOUND 0,0,0
    ,0
810 ? #6:IF #6:" game over
    ..."
815 ? #6:IF #6:IF #6:" YOUR
    SCORE ";;? #6:SCORE
816 FOR VOL=15 TO 0 STEP -0
    .2:SOUND 0,0,2,VOL:NEXT
    VOL
818 ? #6:IF #6:IF #6:" pres
    s trigger":? #6:" T
    O REPLAY"

819 REM **TYPE 'press trigg
    er' AND 'TO REPLAY' IN
    INVERSE VIDEO (ATARI LO
    GO KEY)
820 IF STRIG(0) THEN POKE 7
    11,PEEK(20):GOTO 820
830 SCORE=0:SHOTS=50:H=10:W
    AVE=1:HITS=0:SHOTS=0:GO
    TO 2008
899 REM music for end of at
    tack wave
900 FOR P=1 TO 60:READ VR:F
    OR S9=1 TO 10:SOUND 0,V
    R,14,8:NEXT S9:NEXT P:R
    ESTORE 920
910 SOUND 0,0,0,0:RETURN
920 DATA 45,40,37,40,37,37,
    45,40,37,40,45,47,47,45
    ,40,47,60,45,40,37,37,4
    5,40,37,40,45,47,53,40,
    47,60,45,40,37
921 DATA 40,45,47,45,40,37,
    40,45,47,45,40,47,60,45
    ,40,37,37,45,47,45,47,6
    0,47,45,45,45
999 REM sound for beggining
    of game
1000 FOR TY=2 TO 250 STEP 2:
    SOUND 0,TY,2,10:SETCOLO
    R 1,TY,9:SOUND 1,250-TY
    ,10,4:NEXT TY
1010 SOUND 0,0,0,0:SOUND 1,0
    ,0,0:RETURN
2000 G=0:SQ=1:WAVE=1:HIGH=HI
    GH:H=10:SCORE=0:SHOTS=0
    :DIM F$(100),A$(100),B$
    (100):HITS=0:REM sets u
    p variables

```

continued on next page

Attack at EP-CYG-4[®]

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(206) 644-3425


```

2001 GRAPHICS 1+16
2002 POSITION 2,1:? #6:"stellar defense":POSITION 2,3:? #6;"by mike colvin":POSITION 1,10:? #6;"FOR ATARI 400/800"
2003 POSITION 1,15:? #6;"TO START PRESS THE start KEY.":POSITION 1,18:? #6;"FOR DIRECTIONS PRESS THE fire"
2004 POSITION 1,20:? #6;"BUTTON"
2005 FOR U=1 TO 3000:IF STRIG(0)=1 THEN 2007
2006 SOUND 0,0,0,0:GOTO 700
2007 TTU=PEEK(53279):IF TTU<>6 THEN SETCOLOR 1,U,9:SOUND 0,RND(0)*80+50,10,8:NEXT U:REM waits for a button
2008 SOUND 0,0,0,0:GRAPHICS 2+16:POSITION 1,5:? #6;"stellar defense":GOSUB 1000
2009 REM sets up board

```

```

2010 GRAPHICS 0:POKE 559,0:SETCOLOR 2,0,0:SETCOLOR 1,0,12:YP=INT(RND(0)*15):IF YP<9 THEN YP=9
2011 POSITION 1 20:? "HUMANS"
2012 POSITION 2,21:? H
2013 POSITION 32,20:? "HIGH"
2014 POSITION 33,21:? HIGH
2020 SETCOLOR 1,0,12:SETCOLOR 4,0,6:GOTO 100

```

TYPO TABLE

Variable checksum = 647146				
Line num	range	Code	Length	
0	- 105	WM	519	
106	- 177	ID	544	
179	- 250	BH	490	
251	- 403	HC	382	
404	- 430	DT	515	
449	- 508	QT	404	
510	- 637	BB	592	
638	- 751	GF	550	
760	- 820	YJ	506	
830	- 1000	TL	594	
1010	- 2003	EW	519	
2004	- 2010	RQ	534	
2011	- 2020	FP	177	

TYPO EXPLAINED

Many of the program listings appearing in ANTIC are followed by a TYPO TABLE, which includes a variable checksum. TYPO is a program by Bill Wilkinson that appeared in ANTIC #3. After you've typed in a program, you can use TYPO to generate a TYPO TABLE. Compare this to the table in ANTIC. Discrepancies help you to find and correct typing errors. TYPO can be used by both disk and cassette users.

ANTIC #3 can be ordered as a back issue (\$4.00). The program TYPO is present on ANTIC Utilities Disk #2 (\$10.00 + \$1.50 shipping), without instructions. Either or both can be ordered from: ANTIC Publishing, 297 Missouri St., San Francisco, CA 94107.



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tiny text

by JIM CARR

TINY TEXT is a small but clever cassette-based text editor written by Stan Ockers, originally in the A.C.E. Newsletter (3662 Vine Maple Dr., Eugene, OR 97405). TINY TEXT was never intended to be an all-purpose word processor, even though it does provide several of the important features found in larger programs. TINY TEXT was written to facilitate submission of "machine readable" copy to the Eugene A.C.E. Newsletter. The real advantage of this program is that it is small, inexpensive, and very easy to use.

The program that follows is a slightly-enhanced version that includes:

- Support for Atari 820 printer
- Separate Print and Display modes
- Forms control for Print mode
- Top-of-page command for Print Mode
- Save text on Cassette or Disk
- Error trap control
- Adapts to different RAM sizes

Cassette tapes recorded by the original TINY TEXT can still be used with this modified version. Finally, this version corrects a couple of minor formatting bugs and is about ten percent "tinier" than the original.

USING THE PROGRAM

The [OPTION] key selects one of five options: LOAD, EDIT, PRINT,

SAVE, and DISPLAY. The following paragraphs describe each of these options.

The LOAD option reloads text that was previously saved on cassette or disk. When LOAD is selected, you will be asked to enter the "file spec" of the text you want to load. If the text is on cassette, simply type a C. The computer will "beep" once to remind you to set up the recorder to play. Then press [RETURN] to begin loading the text. If the text is on disk, type the complete file name of the text file, for example "D1:TTHelp.TXT".

The EDIT option lets you enter text or change text previously entered. When the Edit mode is requested, a blank area (text-entry window) appears in the center of the screen. Up to three lines of text can be typed into the window. Pressing [RETURN] causes text in the window to be added to previously entered text. You can use the standard screen-editing functions to edit text in the window. All trailing blanks in the window will be deleted, so it is good to end each entry at the end of a word and start each new entry with a space.

Such functions as tabbing and indentation are controlled by special formatting symbols. These symbols always cause the current line to be ended before the requested formatting function is executed.

CTRL E — End the current line and

start a new line with no indentation.

CTRL I — Indent the next line.

CTRL S — Space before starting the next line.

CTRL T — Tab a specified number of spaces before the next line.

CTRL C — Center the next line.

CTRL P — Page. Advance the paper in the printer to the top of the next page before printing the next line.

When in the Edit mode, pressing the [SELECT] key will cause the line of text below the window to be moved up into the window. The normal screen-editing functions can then be used to fix the text in the window. Use the joystick to scroll the desired line to the position below the text window. Pressing [SELECT] twice (without making any changes) simply causes the text line to move up into the window and then back. To DELETE a line of text, move it below the text window and press [RETURN]. Press the joystick trigger to jump to the end of the text.

The PRINT option prints the formatted text on the printer. Before printing begins you may change the default settings for line length, tab stop, etc. Use the screen-edit functions to make any desired change, then press [RETURN]. The items that may be changed are:

LINE — Line length (maximum number of characters per line).

INDENT — The number of spaces

continued on next page

to be indented (left margin).

TAB STOP — The number of spaces for the tab stop.

PAPER SIZE — The total number of lines that can be printed on a fully-covered page. For example, 11-inch forms with six lines per inch has 66 lines.

FORMS FEED — The number of blank lines printed to separate the bottom of one page from the top of the next. For example, if three blank lines are required at the top and bottom of each page, then Forms Feed is set to six.

SAVE option lets you save text on either cassette or disk. The SAVE selection will ask for the "file name" to be used. If using a cassette, simply type C. The computer will beep twice for you to set up to record. After that, press [RETURN] to begin saving text. To save text on disk, enter the complete file name to be used. For example "D:TTHelp.TXT".

The **DISPLAY** option displays the text on the screen. It provides the same format-change options as the print option. Display is relatively slow. The program jumps to menu immediately after the last line.

PROGRAMMING NOTES

The default settings for the format control functions are defined at line 120.

If you make any changes to this program, you first make a change to line 14 which automatically expands the main data storage array T\$ to use all available memory. Try changing "SIZ = FRE(0) - 50" to "SIZ = FRE(0) - 500". When you have finished making your changes you can restore the statement to its original form.

If a system error occurs, it is trapped and printed out by the program. You are then prompted to press [RETURN] to make the program continue at the OPTION selection mode. This will generally allow you to recover from errors without loss of data.

```
1 REM ***** TINY TEXT *****
2 REM
3 REM Stan Ockers Sept-81
4 REM ACE Newsletter Nov-81
```

```
5 REM
6 REM Mod by Jim Carr 01-
  OCT-82
7 REM
8 DIM SP$(40):FOR I=1 TO
  40:SP$(I,I)=" ":NEXT I
14 DIM S$(45),I$(120),A$(1
  28):SIZ=FRE(0)-50:DIM T
  $(SIZ):FOR I=1 TO 45:RE
  AD A:S$(I)=CHR$(A):NEXT
  I
20 DATA 104,104,133,204,10
  4,133,203,104,133,206,1
  04,133,205,104,104,168,
  162,0,161,203,145,203,1
  98,203,165
30 DATA 203,201,255,208,2,
  198,204,165,203,197,205
  ,208,236,165,204,197,20
  6,208,230,96
40 FOR I=1536 TO 1643:READ
  A:POKE I,A:NEXT I
50 DATA 104,104,133,204,10
  4,133,203,104,133,206,1
  04,133,205,162,0,169,24
  0,32,53,6,169,40,32,91,
  6
60 DATA 165,207,208,8,169,
  160,32,91,6,24,144,10,1
  69,40,32,53,6,169,120,3
  2,91,6,169,240,32,53,6,
  96
70 DATA 133,208,161,203,20
  1,96,176,11,201,32,176,
  5,24,105,64,208,2,233,3
  2,129,205,230,203,208,2
80 DATA 230,204,230,205,20
  8,2,230,206,198,208,208
  ,221,96,133,208,169,0,1
  29,205,230,205,208,2
90 DATA 230,206,198,208,20
  8,244,96
110 P=241:POKE 207,0:POKE 8
  2,0:OPEN #2,4,0,"E":T$(
  1)=".":T$(480)=".":T$(
  2)=T$
120 SCR=PEEK(88)+256*PEEK(8
  9)+120:LL=35:LM=1:IND=5
  :TAB=10:PS=66:FF=6:GOTO
  500
290 ? "INSERT TEXT OR ...
  PRESS SELECT TO EDIT"
300 POSITION 0,0: ? SIZ-LEN(
  T$): ? "FREE ":S=STICK(
  0):IF S=15 THEN 330
305 IF S=14 AND P<LEN(T$)-3
  20 THEN P=P+40
310 IF S=13 AND P>280 THEN
  P=P-40
315 IF S=11 AND P<LEN(T$)-2
  80 THEN P=P+1
320 IF S=7 AND P>241 THEN P
  =P-1
330 A=USR(1536,ADR(T$)+P-24
  1,SCR)
335 K=0
340 POKE 53279,8:PK=PEEK(53
  279):IF PK=5 THEN GOSUB
  900
350 IF PK=3 THEN 500
```

```
360 IF PEEK(764)<255 THEN 4
  00
365 K=K+1:IF K<10 THEN 340
370 IF STRIG(0)=0 THEN P=LE
  N(T$)-240:POKE 207,0
380 GOTO 300
400 POSITION 0,10:INPUT #2:
  I$:PK=PEEK(207):IF PK=0
  THEN A$=""
405 LI=LEN(I$):LT=LEN(T$):I
  F LI=0 THEN 460
407 IF LI+LT>SIZ THEN POSIT
  ION 0,1: ? "OUT OF SPACE
  ":GOTO 300
410 IF PK=1 THEN A$=T$(P,P+
  39):IF T$(P+39,P+39)=""
  THEN I$(LI+1)="" :LI=
  LI+1
420 LA=LEN(A$):AD=ADR(T$):I
  F LI>LA THEN A=USR(ADR(
  S$),AD+LT-1,AD+P-2,LI-L
  A)
430 T$(P,P+LI-1)=I$
440 IF LA>LI THEN T$(P+LI)=
  T$(P+LA)
450 P=P+LI:T$(LT+LI-LA+1)=""
  :POKE 207,0:GOTO 300
460 IF PEEK(207)=1 THEN 470
465 IF P<LEN(T$)-279 THEN T
  $(P)=T$(P+40)
470 POKE 764,255:GOTO 300
500 TRAP 950:ST=PEEK(560)+P
  EEK(561)*256+4:POKE ST-
  1,70:POKE ST+2,7:POKE S
  T+3,112:POKE ST+4,6:POK
  E ST+5,6
501 POKE ST+24,65
510 POKE ST+25,PEEK(560):PO
  KE ST+26,PEEK(561)
515 OP=OP+1:IF OP=6 THEN OP
  =1
520 ? CHR$(125):POSITION 20
  ,0:IF OP=1 THEN ? "LOAD
  "
522 IF OP=2 THEN ? "EDIT"
534 IF OP=3 THEN ? "PRINT"
536 IF OP=4 THEN ? "SAVE"
538 IF OP=5 THEN ? "DISPLAY
  "
540 POSITION 0,1: ? "PRESS S
  TART TO BEGIN"
550 FOR D=1 TO 30:NEXT D
555 POKE 53279,8:IF PEEK(53
  279)=3 THEN 515
557 IF PEEK(53279)<>6 THEN
  555
560 POKE 764,255:POSITION 2
  0,1: ? CHR$(125):POSITIO
  N 0,1:ON OP GOTO 2000,2
  90,590,1500,590
590 FOR I=1 TO 6: ? CHR$(127
  ):CHR$(158):NEXT I: ?
  FOR I=1 TO 6: ? " :CHR
  $(159):" :NEXT I
594 POSITION 0,1: ? "SET FOR
  MAT CONTROLS:POSITION
  0,6: ? "LINE LEFT IN- T
  AB PAGE FORM"
595 ? "SIZE MARG DENT STOP
  SIZE FEED": ? CHR$(127):
```



```

LL,"";CHR$(127);LM,"";
CHR$(127);IND,"";CHR$(
127);
596 ? TAB,"";CHR$(127);PS;
",CHR$(127);FF:POSITI
ON 0,8
600 INPUT LL,LM,IND,TAB,PS,
FF:P=240:P=240:GO TO 71
0
610 P=240
670 GOTO 620
710 LINE=0:GRAPHICS 0:POSIT
ION 0,3:FL=0
715 RL=LL:TP=P:B=ASC(T$(TP,
TP))
720 RL=LL-IND*(B=9)-TAB*(B=
20)
725 IF B=19 AND OP=3 AND LI
NE<=(PS-FF) THEN LPRINT
" ":LINE=LINE+1
726 IF B=19 AND OP=5 THEN ?
727 IF B=16 AND OP=3 THEN F
OR I=1 TO PS-LINE:LPRIN
T " ":NEXT I:LINE=0
728 IF B=16 AND OP=5 THEN ?
I? I? :LINE=0
735 C=0:K=0
740 K=K+1:TP=TP+1:IF K=RL+1
THEN 765
745 IF TP>LEN(T$)-241 THEN
FL=1:GOTO 810
750 A=ASC(T$(TP,TP)):IF A<3
2 THEN C=0:GOTO 780
755 IF A=32 THEN C=C+1
760 GOTO 740
765 IF C=0 THEN A$=T$(P+1,T
P-1):TP=TP-1:GOTO 810
767 IF T$(TP,TP)="" THEN A
$=T$(P+1,TP-1):GOTO 810
768 IF T$(TP-1,TP-1)="" TH
EN C=C-1
770 K=1
775 TP=TP-1:IF T$(TP,TP)(<)"
" THEN K=K+1:GOTO 775
780 IF TP=P+1 THEN P=TP:GOT
O 715
785 A$="":I=P+1

```

```

790 A$(LEN(A$)+1)=T$(I,I):I
F T$(I,I)(<)" " THEN 805
795 IF C>1 THEN A=INT(K/C+A
ND(0)):IF A>0 THEN FOR
J=1 TO A:A$(LEN(A$)+1)=
" ":NEXT J:K=K-A
800 C=C-1
805 IF C=1 AND K>0 THEN FOR
J=1 TO K:A$(LEN(A$)+1)
=" ":NEXT J
805 I=I+1:IF I<TP THEN 790
810 IF FL THEN A$=T$(P+1,TP
-1)
815 IF OP=3 THEN LINE=LINE+
1:IF LINE>(PS-FF) THEN
LINE=1:FOR I=1 TO FF:LPR
INT " ":NEXT I
820 SP=LM+(B=9)*IND+(B=20)*
TAB+(B=3)*(LL-LEN(A$))/
2:IF SP>40 THEN SP=40
830 IF OP=3 THEN LPRINT SP$
(1,SP);A$
840 IF OP=5 THEN ? SP$(1,SP
);A$
850 IF FL THEN 500
860 P=TP:GOTO 715
900 PK=PEEK(207):IF PK=1 TH
EN POKE 207,0:GOTO 930
910 IF PK=0 AND P<LEN(T$)-2
79 THEN POKE 207,1

```

```

930 A=USR(1536,ADR(T$)+P-24
1,SCR):FOR D=1 TO 50:NEXT
D:RETURN
950 ? "ERROR ";PEEK(195);"
AT ";256*PEEK(187)+PEEK
(186):? "PRESS RETURN T
O CONTINUE":INPUT I$:GO
TO 500
1500 ? " ENTER FILE NAME":IN
PUT I$:OPEN #3,8,0,I$:N
=INT(LEN(T$)/128):LPRINT
#3,N:IF N=0 THEN ST=0:
GOTO 1520
1510 FOR I=1 TO N:ST=128*I:P
RINT #3,T$(ST-127,ST):N
EXT I
1520 PRINT #3,T$(ST+1,LEN(T$
)):CLOSE #3:GOTO 500
2000 ? " ENTER FILE NAME":IN
PUT I$:OPEN #3,4,0,I$:I
NPUT #3,N:IF N=0 THEN B
EG=-127:GOTO 2020
2010 GRAPHICS 0:FOR I=1 TO N
:BEG=128*I-127:INPUT #3
,A$?:A$;T$(BEG)=A$:NEX
T I
2020 INPUT #3,A$:T$(BEG+128)
=A$:CLOSE #3:POKE 1536,
104:GOTO 500

```

TYPE TABLE

Variable checksum = 697637

Line num	range	Code	Length
1	- 40	YW	509
50	- 110	SB	536
120	- 340	BY	525
350	- 420	ZC	500
430	- 520	JC	536
522	- 594	HJ	570
595	- 727	IS	505
728	- 775	CK	495
780	- 820	RC	515
830	- 1510	BL	556
1520	- 2020	IV	310

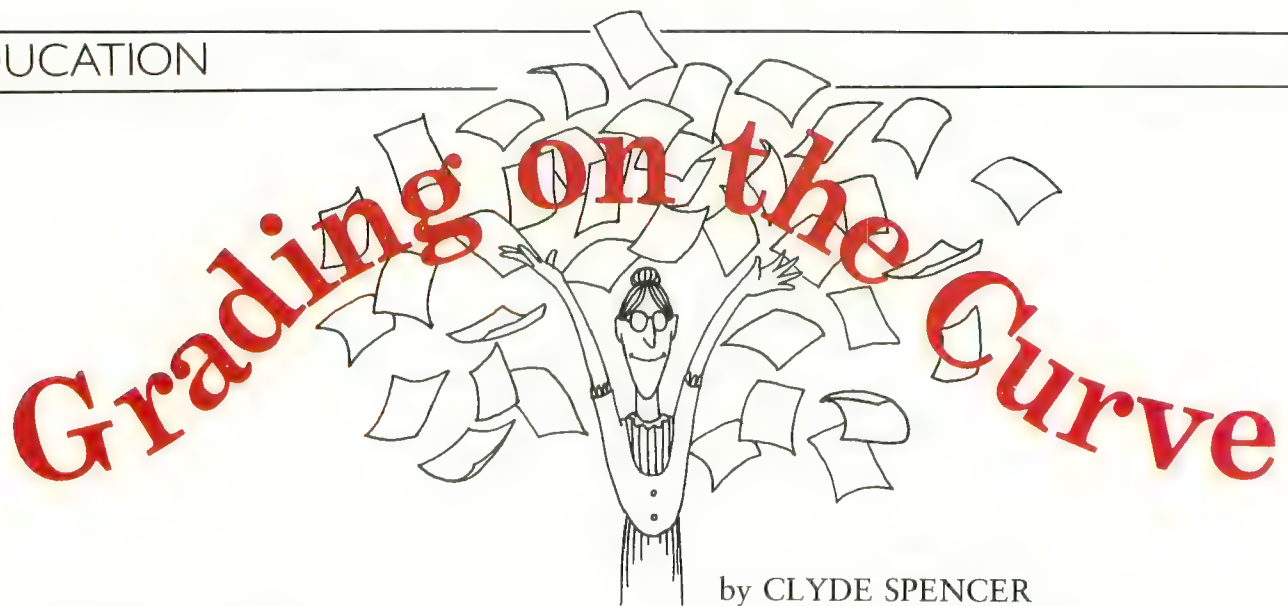
WRITE FOR ANTIC

As many of you know our motto reads, "if you own an ATARI, you should be reading ANTIC." We believe this and are proud of the leading role we have taken in the ATARI-user community. Now, let's extend the motto, "if you own an ATARI, share what you've learned — write for ANTIC."

Useful material can be as short as a note to the Editors for I/O Board, or several pages for our Assembly Language department, or anything in between.

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ANTIC is continuing its rapid growth, so there will be more pages, a greater variety of features and departments, and room for you. So, SHARE WHAT YOU'VE LEARNED.



by CLYDE SPENCER

The many ways to assign student's grades all seem to have their advantages and disadvantages. It is likely that the technique you use was originally adopted for its simplicity, speed and ease of use. Tossing the papers down the stairs and giving A's to the farthest even has some merit. However, a more professional approach might be desired.

Most approaches require additional effort and varying degrees of mathematical expertise, and the more rigorous, statistically-based ones have not been in favor.

Let's assume you are teaching a course where frequent standardized testing is appropriate and the students' abilities and accomplishments can be expected to be "normally distributed". If you plotted the numeric scores against the number of students that received scores within a given small interval, the plot would approximate the standard "Bell" shape. You should have at least 20 students minimum — a typical class size.

In a classroom like this you might be interested in a method utilizing "McCall's T Scores". It is a statistically-based technique that can be quite objective. Its singular greatest disadvantage used to be the amount of time it took to do the calculations. It used to take me about 2½ hours with a powerful hand calculator for a class of 30 to 40 students. With your ATARI computer it takes about as much time to enter raw scores in your gradebook as it takes to enter the scores on your computer keyboard. Twenty minutes later you can have a list from your printer that may be acceptable by your school administrators in lieu of your gradebook. It is also a relatively minor task to change a grade (especially with Visicalc) when you find that you have made the inevitable mistake.

This approach also takes into account variations in the level of difficulty of your tests and a student's preparation. In your current grading system you may assign 70% as the breaking point between a "C" and a "D", and this will be much too subjective and totally unreasonable for some exams.

An important advantage of this method is that both you and the students can have a good idea of what a student's

class standing is at any time. The student's grade is determined by adding together all his McCall's T scores and dividing by the number of scores. That average is then compared with the equivalent letter grades.

The McCall's T score will "normalize" all the scores and compare the class performance as a whole against the individual scores, not some predetermined absolute. If your mathematics is strong, you can verify the algebraic manipulations from the BASIC program listing which follows. For the rest of you, you must trust that the approach calculates the class average (mean) and standard deviation. The mean is then subtracted from the individual student's score and divided by 1/10th the standard deviation. This gives a number between about -25 and +25, with most near zero. The constant 50 is then added to be sure all the numbers are positive. That is your McCall's T score. Fifty percent of the students will always have scores greater than 50. Sixty-eight percent will have scores between 40 and 60 and better than ninety-five percent of all the students will have a score between 30 and 70.

If you've ever been exposed to statistics, those numbers should look vaguely familiar. They represent 1 and 2 standard deviations from the mean. If you wanted to give no more than 15% A's, you would see that about 15% of the area in a normal curve is found above a value of 1.04 standard deviations above the mean. That would translate into a McCall's T score of 60.4 ($10 \times 1.04 + 50$). I have in the past adopted cutoffs of 30, 40, 50 and 60. That effectively gives 50% A's and B's which is in line with a community college average.

If I've convinced you to try something new, what follows are a Visicalc template and a less elegant BASIC program along with sample printouts. You will find the BASIC program easier to type in than the Visicalc template, but Visicalc is definitely the preferred way to go!

Your students, being human, will never have seen anything like this before and some will resist change. You will need to explain the procedure to them, and re-explain it. If you think the method has merit, hang in there, but expect

and be prepared for complaints. Just as there is no perfect form of government, there is no perfect grading system!

GRADING

All grade scores will be reported in terms of McCall's T score as well as the raw score. for conversion to letter grade:

McCall's T score is defined as follows:

$$T = 50 + 10Z$$

where $Z = (Y_1 - Y) / S$

$$\text{and } S = \sqrt{\frac{\sum Y_1^2 - \left[\frac{(\sum Y_1)^2}{N} \right]}{N-1}} \quad \text{if } N \leq 30$$

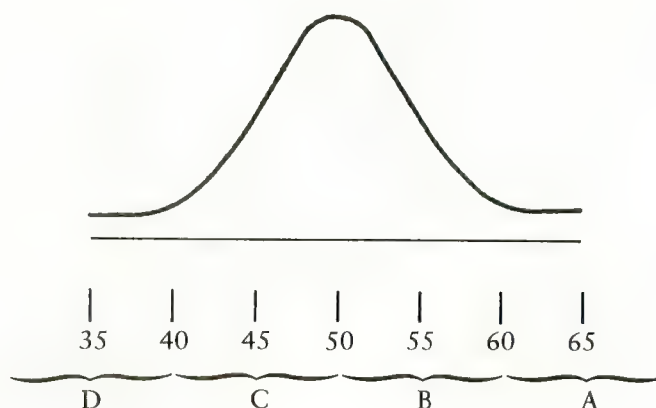
S = sample standard deviation

Y_1 = students raw score

Y = class mean

N = total sample number

therefore $T = 50 + 10(Y_1 - Y) / S$



COURSE: TYPING 001 DATE: 14 FEB. 1983

QUIZ #1			QUIZ #1		
STUDENT NAME	RAW SCORE	"T" SCORE	STUDENT NAME	RAW SCORE	"T" SCORE
Abbey, James	42	58.79	O'Neal, Doug	12	30.96
Blake, John	34	51.37	Perez, Delores	25	43.02
Castro, Jessee	49	65.29	Quezada, Betina	21	39.31
Dalton, Maria	24	42.09	Reddy, Barbara	18	36.52
Ellis, Mark	35	52.30	Sanford, Tom	41	57.86
Felix, Gloria	26	43.95	Takahashi, Isao	41	57.86
Gallo, Joe	30	47.66	Unger, Max	50	66.21
Hanes, Sam	22	40.24			
Ivanovich, William	41	57.86	TOTAL	683	
Jackson, Anthony	40	56.94	NUMBER	21	
Kaufman, David	31	48.59	AVERAGE (MEAN)	32.52	
Lang, Mary	47	63.43	STAN. DEV.	10.78	
Malone, Kathy	22	40.24	HIGH	50	
Nguyen, Kim	32	49.51	LOW	12	

```

10 REM WRITTEN BY CLYDE H. SPENCER
20 REM
30 REM SN$:STUDENT NAMES
40 REM RS(n):RAW SCORES
50 REM MTS(n):McCALL'S T SCORES
60 REM M:CLASS MEAN
70 REM SD:STANDARD DEVIATION
80 REM C:CONSTANT=50
90 REM
100 DIM SN$(25),RS(100),MTS(100)
110 OPEN #1,8,0,"D:NAMES.DAT"
120 TRAP 120:PRINT "NUMBER OF STUDENTS TAKING EXAM";:INPUT NUM

```

continued on page 67

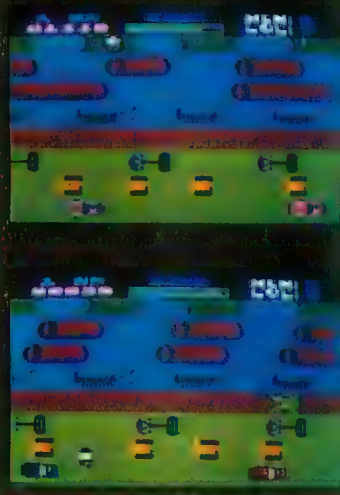


PREPPIE II IS HERE!

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"My Atari never did things like this before!"
—Holister Townsend Wolfe

"I had so much fun I almost blew my doughnuts."
—Theodore Boston III

"I haven't had this much fun since Buffy and I went to Princeton for the weekend."
—Martha Vineyard

continued from page 65

```

130 LET SUM=0:LET SUM2=0:LET C=50
140 FOR N=1 TO NUM
150 PRINT "NAME";:INPUT SN$
160 TRAP 160:PRINT "RAW SCORE";:INPUT RS:LET RS(N)=RS
170 PRINT #1,SN$
180 LET SUM=SUM+RS(N)
190 LET SUM2=SUM2+RS(N)*RS(N)
200 NEXT N
210 CLOSE #1
220 TRAP 400:LET M=SUM/NUM:LPRINT " ", "MEAN=";INT(100*M+0.5)/100;
230 LET SD=SQR((SUM2-(SUM*SUM)/NUM)/(NUM-1)):LPRINT " STD. DEV.=";INT(100*SD+0.5)/100:LPRINT
240 TRAP 40000:OPEN #1,4,0,"D:NAMES.DAT"
250 FOR N=1 TO NUM
260 LET MTS(N)=C+10*(RS(N)-M)/SD
270 INPUT #1,SN$
280 LPRINT SN$,RS(N),INT(100*MTS(N)+0.5)/100
290 NEXT N
300 CLOSE #1:END
400 PRINT "TURN ON THE PRINTER!"
410 FOR DELAY=1 TO 1000:NEXT DELAY
420 GOTO 220

```

VISICALC TEMPLATE

>E34:@MIN(E6...E26)		
>C34:"LOW		
>E33:@MAX(E6...E26)		
>C33:"HIGH		
>E32:/F#@SQRT((G29-((E29*E29)/E30))/(E30-1))		
>C32:"STAN. DEV.		
>E31:/F#@AVERAGE(E6...E26)	>B20:/FL	>F9:/F\$50+(10*(E9-E31)/E32)
>C31:"AVERAGE	>G19:+E19*E19	>B9:/FL
>E30:@COUNT(E6...E26)	>F19:/F\$50+(10*(E19-E31)/E32)	>G8:+E8*E8
>C30:"NUMBER	>B19:/FL	>F8:/F\$50+(10*(E8-E31)/E32)
>G29:@SUM(G6...G26)	>G18:+E18*E18	>B8:/FL
>E29:@SUM(E6...E26)	>F18:/F\$50+(10*(E18-E31)/E32)	>G7:+E7*E7
>C29:"TOTAL	>B18:/FL	>F7:/F\$50+(10*(E7-E31)/E32)
>F27:/--	>G17:+E17*E17	>B7:/FL
>E27:/--	>F17:/F\$50+(10*(E17-E31)/E32)	>G6:+E6*E6
>D27:/--	>B17:/FL	>F6:/F\$50+(10*(E6-E31)/E32)
>C27:/--	>G16:+E16*E16	>B6:/FL
>B27:/--	>F16:/F\$50+(10*(E16-E31)/E32)	>F5:/--
>G26:+E26*E26	>B16:/FL	>E5:/--
>F26:/F\$50+(10*(E26-E31)/E32)	>G15:+E15*E15	>D5:/--
>B26:/FL	>F15:/F\$50+(10*(E15-E31)/E32)	>C5:/--
>G25:+E25*E25	>B15:/FL	>B5:/--
>F25:/F\$50+(10*(E25-E31)/E32)	>G14:+E14*E14	>F4:" "T" SCORE
>B25:/FL	>F14:/F\$50+(10*(E14-E31)/E32)	>E4:" RAW SCORE
>G24:+E24*E24	>B14:/FL	>C4:" NAME
>F24:/F\$50+(10*(E24-E31)/E32)	>G13:+E13*E13	>B4:" NO.
>B24:/FL	>F13:/F\$50+(10*(E13-E31)/E32)	>F3:/FL"
>G23:+E23*E23	>B13:/FL	>E3:" QUIZ #
>F23:/F\$50+(10*(E23-E31)/E32)	>G12:+E12*E12	>D3:"T
>B23:/FL	>F12:/F\$50+(10*(E12-E31)/E32)	>C3:" STUDEN
>G22:+E22*E22	>B12:/FL	>B3:" STUDENT
>F22:/F\$50+(10*(E22-E31)/E32)	>G11:+E11*E11	>E1:" DATE:
>B22:/FL	>F11:/F\$50+(10*(E11-E31)/E32)	>B1:" COURSE:
>G21:+E21*E21	>B11:/FL	/W1
>F21:/F\$50+(10*(E21-E31)/E32)	>G10:+E10*E10	/GOR
>B21:/FL	>F10:/F\$50+(10*(E10-E31)/E32)	/GRM
>G20:+E20*E20	>B10:/FL	/GC12
>F20:/F\$50+(10*(E20-E31)/E32)	>G9:+E9*E9	/X>A26:>A45:



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Cost of Reports Program (Included In Program)	\$00.00		Designate Font To Be Used In Report	YES	
Compatible With Letter Perfect (tm)	YES		Boldfacing Allowed In A Report (With Dot Matrix Printer)	YES	
Word Processing			Mathematical Formulas Allowed In Report (Example, Field 'x' + Field 'y' = Field 'z')	YES	
Menu Driven (Very User Friendly)	YES		Auto Page Number Allowed In Report	YES	
Complete Documentation (Manual Tabbed And Indexed)	YES		Auto Date Entering Allowed In Report	YES	
Single Load Program (No Swapping Of Program Diskette)	YES		Repeating Characters Allowed	YES	
Machine Language (Extremely Fast Operation)	YES		Optional Level Breaks and Page Breaks When Sort Values Change	YES	
Can Use Single Disk Drive	YES		Up To 7 Lines Allowed For Header on Each Report	YES	
Can Use Multiple Disk Drives	YES		Up To 2 Lines Allowed For Detail Information On A Report	YES	
Ability To Design Screen Mask (User Designs Arrangement Of Data)	YES		Variable Spacing Allowed Between Data On Items In A Report	YES	
Full Keyboard Editing Available (Delete/Insert A Character; Go To End/Beg. of Line; Fine 'n', TAB, ETC.)	YES		Multiple Fields Allowed In A Report (Number, Date, Alpha, Formula)	YES	
Compatible With Bit 3 80-Column Board (40-Column and 80-Column Version Available)	YES		Search Criterion Allowed On Report (Same Criteria As In Editor)	YES	
Works With Any Parallel Printer (Supports Atari 850 Interface)	YES		Ability To Have "Literal" Data Printed In A Report	YES	
Totals Of Numeric Field (Return Total And Average Value/Field)	YES		Ability To Have "Conditional" Data Printed In A Report	YES	
Fail Safes Provided For Data Protection	YES		Use A Default Date Field	YES	
Error Messages Displayed	YES		Designate Default Value For Specific Fields	YES	
Status Lines For Ease Of Use (Options Always Available For Reference)	YES				
SEARCHES AND EDITING			LABELS REPORT GENERATOR		
Multiple Searches Allowed On Same Record (Search On 9 Criteria Per Record)	YES		Mailing Labels Allowed (Specifically Designed For Labels)	YES	
Search On Two Criteria In Same Field (Up To 4 Fields In Single Record)	YES		User Designs Data Placement On Label (One Across Label Design)	YES	
Wild Card Searches (And/Or, Include, Character, Or Block)	YES		Multiple Fields Allowed On Label (Date, Alpha, Numeric, Formula)	YES	
Search On Basis Of Record Number (Search For An Individual Record)	YES		Repeating Characters Allowed	YES	
Search On Range Of Data Desired (Dates, Numbers, Values, Greater Or Less Than, Equal To, etc.)	YES		Front Designation Allowed	YES	
Editing Of Records Individually	YES		Print Labels On A Conditional Basis	YES	
Editing Records Globally (Verification Allowed)	YES		Search Criteria Valid On Label (Same Search Criteria As Editing)	YES	
Delete Records Individually (Verification Allowed)	YES				
Deleting Records Globally (Verification Allowed)	YES				
UTILITIES SECTION			MATHEMATICAL ABILITIES		
Add Fields To Existing Data Base	YES		Basic Math Calculation Addition, Subtraction, Multiplication, Division	YES	
Delete Fields From Existing Data Base	YES		Built In Calculator (Automatic) (Use In Editing, Or Adding Data)	YES	
Reformat A Data Base (Copy Format Of Existing Data Base)	YES		Find the Integer Value Of A Numeric Expression	YES	
Make Additional Copies Of Data Base (Create Data Base For Extended Records)	YES		Find The Log Base 'e' Of 'x'	YES	
Sort on Multiple Criteria (Sort On Basis Of 4 Fields In A Sort)	YES		Find The Log Base '10' Of 'x'	YES	
Sorts On Multiple Criteria (Ascending Or Descending)	YES		Find The Absolute Value Of 'n'	YES	
Depth Of Sort Can Be Changed (Designate Number Of Charters Deep To Sort)	YES		Exponential Notation Used	YES	
Merge Information From Other Data Bases (Merge Standard Text Files)	YES		Find The Square Root Of 'n'	YES	
Add Or Delete Fields From Data Base	YES		Formulas Allowed Between Fields (Field x (+ - *) Field y = Field z) (Field x (+ - *) N = Field Y)	YES	
Merge Previous Entered Data From Existing File	YES				
Back Up A Data Base (Make A Back Up Of Current Source Data)	YES		SPECIFICS		
Pack A Data Base (Remove Deleted Records From Disk Storage)	YES		Maximum Number Of Fields Per Record	32	
			Maximum Number Of Formulas In A File	16	
			Maximum Length Of A Field	127	
			Maximum Record Length	511	
			Maximum Number Of Level Breaks	4	
			Records Per Diskette (Depends On Length And Number Of Fields)	VAR.	
			Data Bases Allowed On Each Diskette (Can Be Expanded To Additional Diskettes)	ONE	
			Form Letter Capability (Compatible With Letter Perfect)	YES	

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PACTR POKER

by CARL EVANS

In the last two issues we discussed cassette tapes for the ATARI 410 Program Recorder and began to investigate its inner workings. This time we will delve a bit further into the playback circuit. I'll also explain why you have to press [RETURN] twice for a CLOAD or CSAVE.

Figure 1 shows a functional block diagram of the playback circuit in your 410 Recorder. The playback circuit

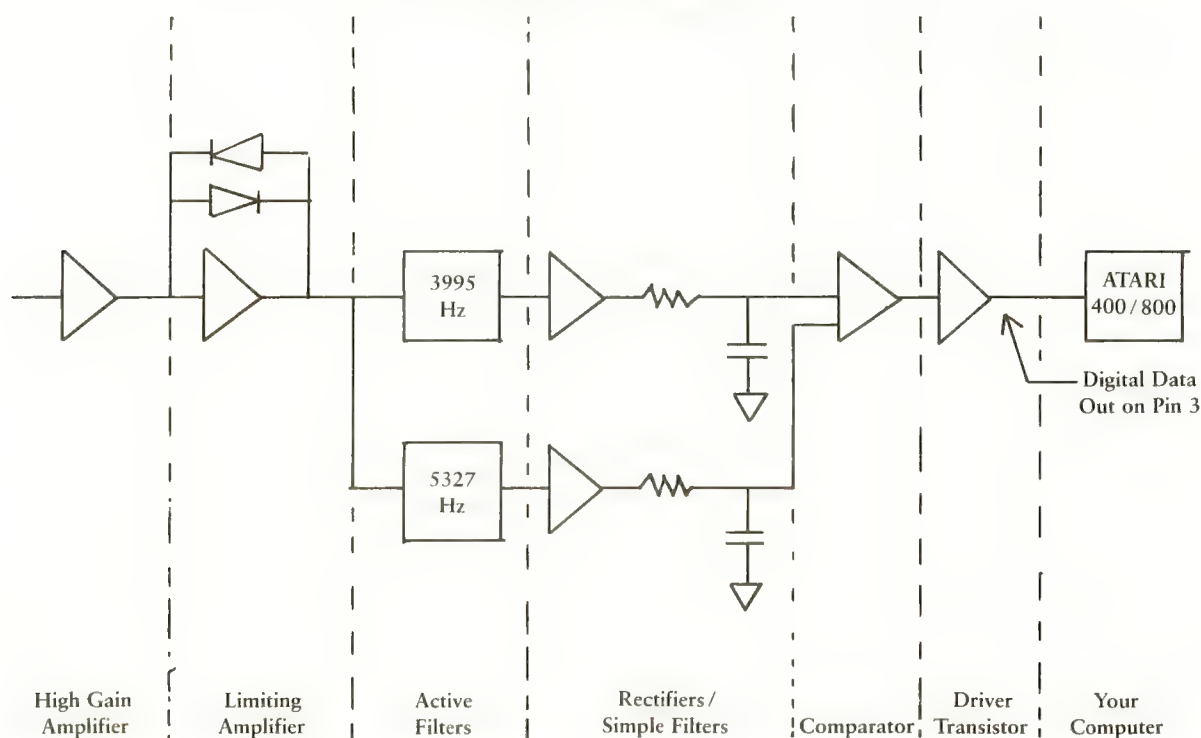
uses an "active filter" network to separate the 3995 Hz (ZEROs) and the 5327 Hz (ONEs) and send each kind of signal down two parallel lines. The signals are then cleaned up by passing them through a simple rectifier and a filter. This "dry cleaning" leaves you with a signal that is essentially DC (constant voltage). Each of these DC signals is fed into opposite sides of a comparator, where output is further

filtered and passed on to a "driving" transistor which drives the data line to your computer.

This circuit converts the Frequency Shift Keying (FSK) signals that were recorded on your tape into a binary-serial data stream for input to your computer.

The reason why two [RETURN]s must be pressed for every CLOAD or CSAVE is that the first [RETURN]

Figure 1.
ATARI 410 Recorder Playback
Circuit Block Diagram



signals the Operating System (OS) to accept your command. When the OS receives a cassette LOAD or SAVE command it jumps to a special part of the OS called the "cassette handler." Up to this point, no signals are sent out from the Recorder. Atari designed the handler this way to give you a chance to prepare the tape before the Recorder is activated.

The cassette handler will sit there until it gets a second [RETURN]. When your computer is first powered up, the Motor Control Line (pin 8) of the serial bus connector is initialized in a "low" state (zero voltage). This line is connected to the motor ON/OFF control in your 410 Recorder. When you press the second [RETURN], this line is fed a positive voltage that activates the Recorder motor.


You can fool the Operating System

into thinking you have already pressed [RETURN] twice. If you use a CLOAD or CSAVE command in your program, all you have to do to eliminate the second [RETURN] is to precede the I/O command with POKE 764,12. This POKEs a [RETURN] code into the "last key pressed" buffer. So, when the CLOAD command is encountered and the cassette handler is called up, the [RETURN] is already there for the cassette handler. The computer will beep at you normally, but the CLOAD or CSAVE operation will begin *immediately*.

Another trick POKE lets you turn the cassette motor ON and OFF under software control. POKE 54018,52 will turn the Recorder's motor ON and POKE 54018,60 will turn it back OFF. Location 54018 is called PACTL. This PACTL trick will allow you to listen to a cassette tape without actually trying

to CLOAD it. I use this capability to locate the start of a file on a tape. For example, I had one adventure game program that I could not set to load. Finally I tried the PACTL trick to see if there even *was* a file on the tape! I found the file way out at a tape counter value of 68, and it loaded fine once I found it. You could also POKE PACTL to listen to music over your TV speaker, or even to activate a special controller to operate household appliances.

Next issue I will give you the schematic diagram for the 410, along with a parts list, and identify a few key components that you can replace to improve the reliability of your CLOADs.

Your letters have been pouring in. There is not enough time to answer all of you individually. Those of you who have really serious problems, I will try to answer with a letter. 



Tangle Angles

Here begins our clinic on tape problems, in response to your letters as invited in past issues. I regret we can't cover more this time, but at least it's a start. Some urgent problems I have answered individually by return mail. We expect to devote more space to this feature in future issues. —Carl Evans.

Dear Mr. Evans:

You asked for comments regarding the 410 Program Recorder. I have one, which at present is not operating. The left side of the lid, where the arm extends back into the machine, cracked

when the lid was raised with the eject button. A call to Chicago revealed that they wanted \$40.00 as a flat charge and would not send a new lid for me to change. I think this is unnecessary and unreasonably high-priced. Because of that, my lid is still broken.

Thomas A. Mabel, M.D.
Noblesville, IN

Finding replacements for 410 Recorder parts is no easy task. I finally located one source at the Foothill Computer Center in Upland, California. They are an authorized Atari Service Center

and should be able to supply you with virtually any Atari component you might need. I asked them specifically about your broken lid and they said they would send you one for about \$7 plus shipping. Their address is:

Foothill Computer Center
Attn: Mr. Jim Degner
949 W. Foothill Blvd.
Upland, CA 91786
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If you, or any of you other readers, know of a good source for parts near to you, then send their name, address, and phone number to me so I can spread the word.

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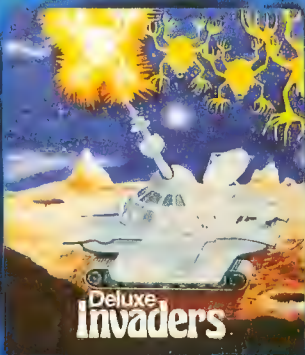
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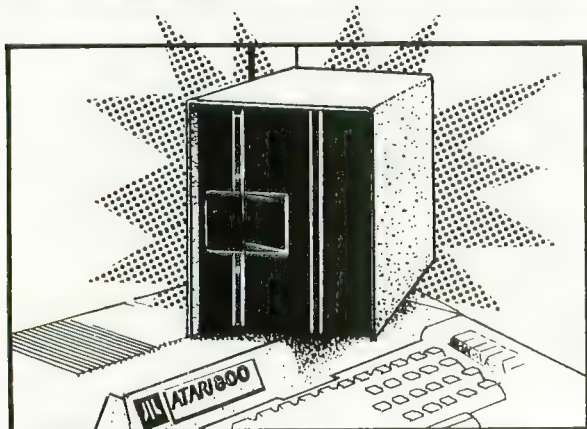


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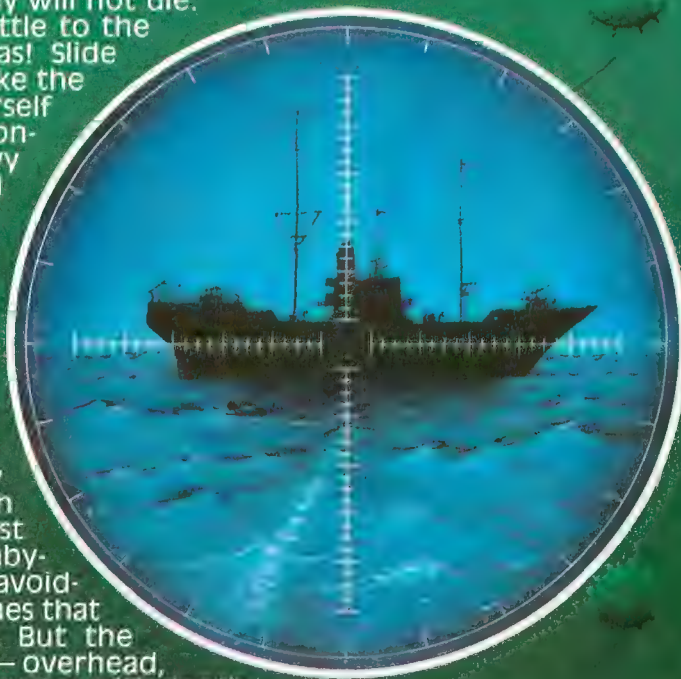
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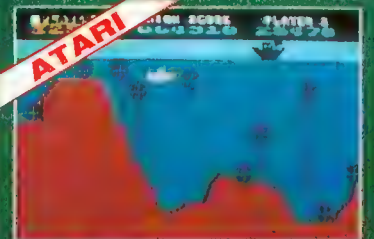
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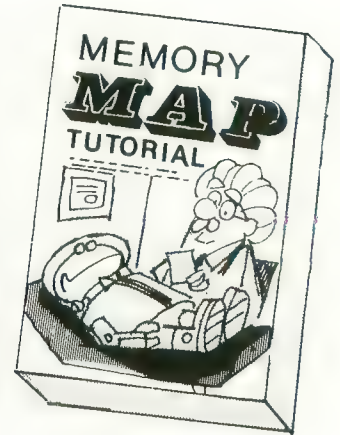
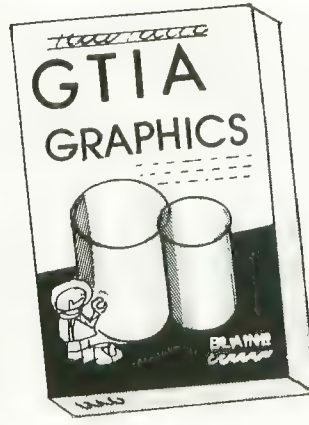
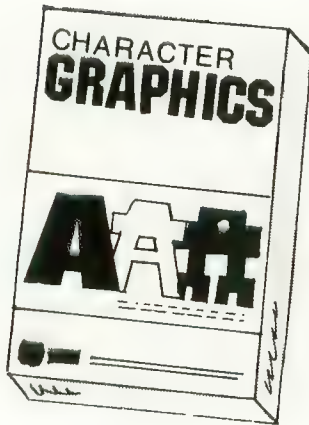
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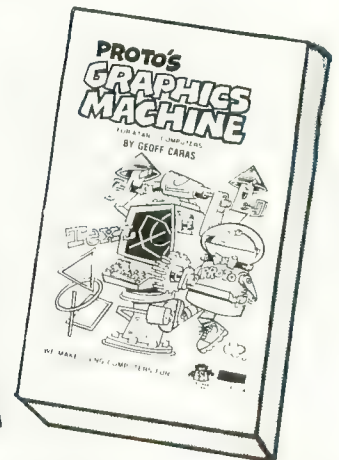
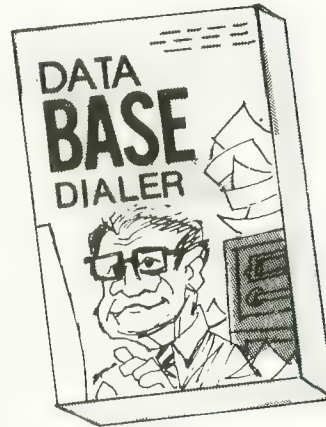
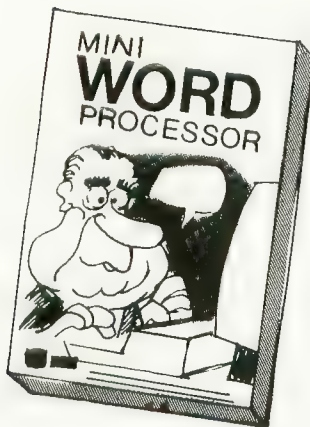
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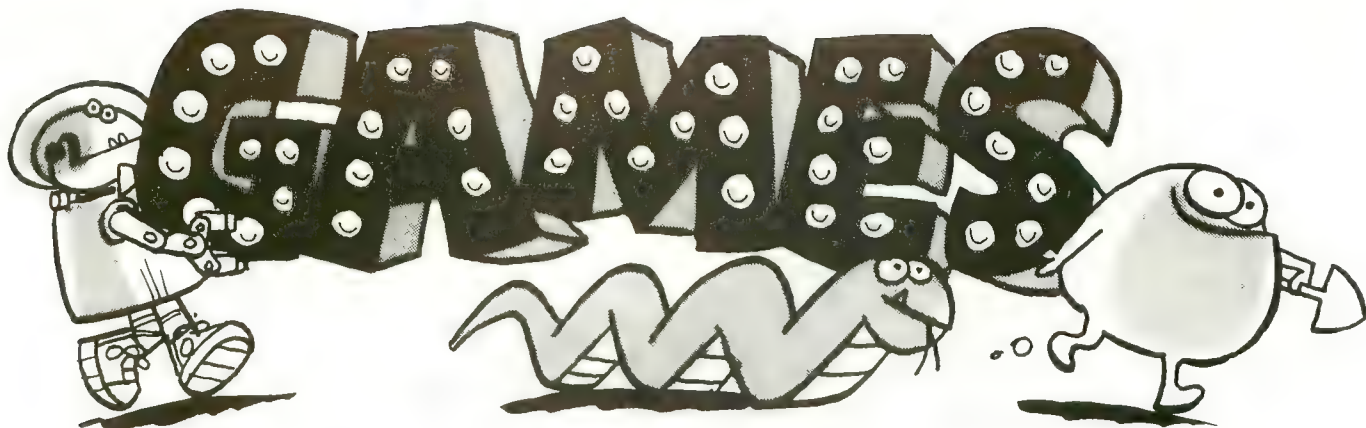


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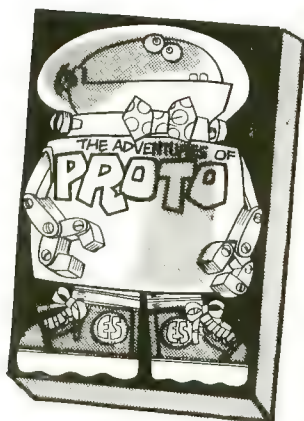
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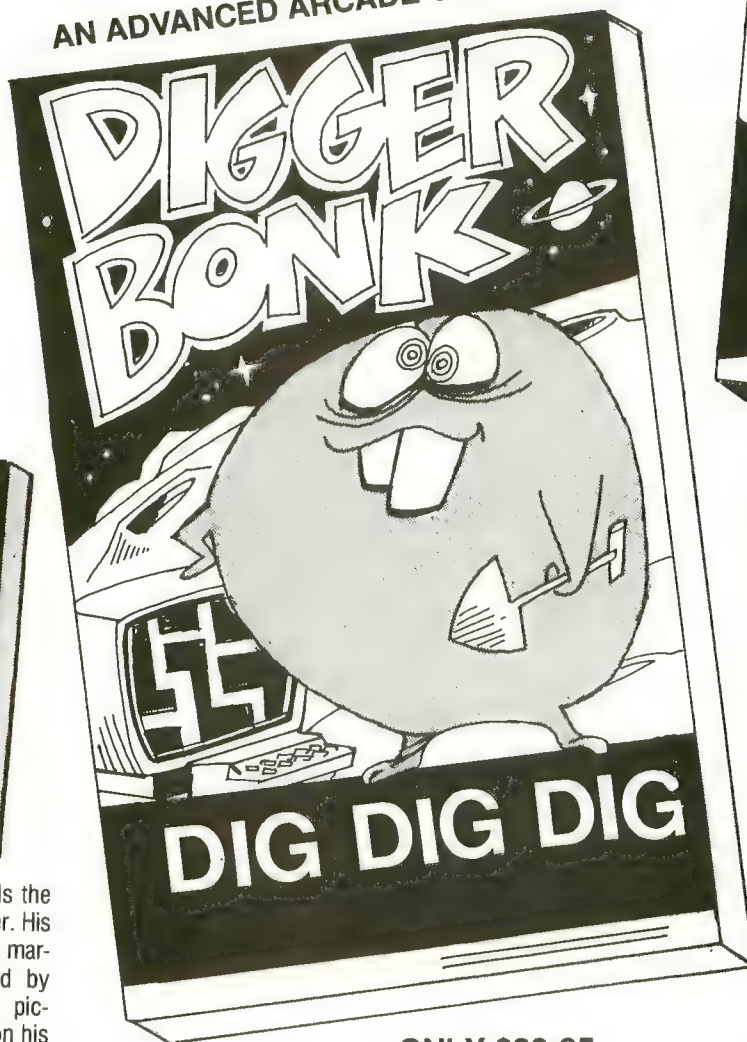


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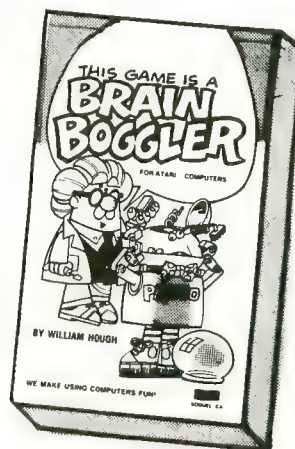


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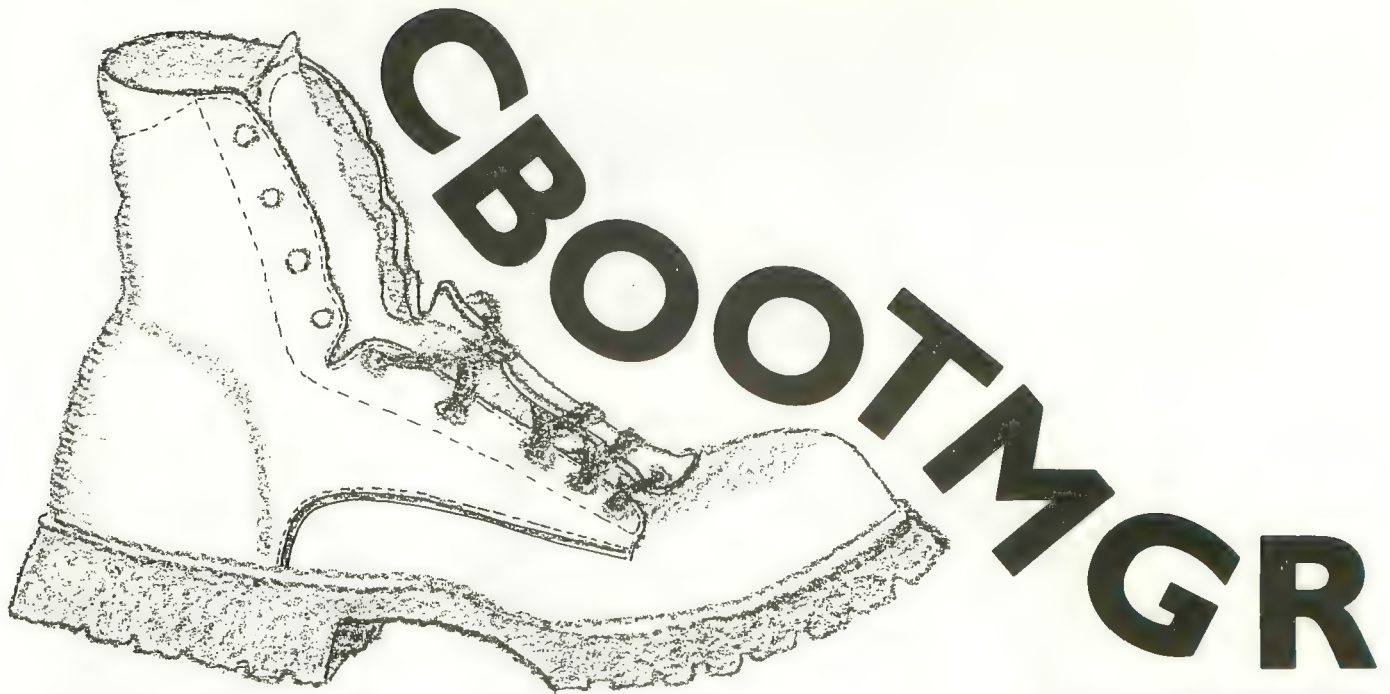
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by HARALD STRIEPE

Most ATARI owners start out with a cassette-based system. CASSETTE BOOT MANAGER will help you make backups of your single-stage boot tapes, and permit you to convert them to boot disks later on. The program also includes two general, *relocatable* subroutines important for handling Input/Output thus overcoming the most significant shortfalls of Atari's 8K BASIC.

Sectors on single-density disk drives contain the same number of bytes (128) as the "records" of the cassette system. Each cassette record is separated from the next by a recording gap, which also contains a marking tone. This tone makes it possible for the ATARI to adjust its receiving procedure to match the varying speed of the cassette recorder.

There are two kinds of gaps, long and short (LIRG and SIRG). You might have encountered these when you used CSAVE (SIRG) or SAVE "C:" (LIRG). The two methods store information identically, the only difference is the gap length between each record. LIRG is long enough to permit recorder motor to stop completely, while SIRG needs the motor to keep running.

Obviously, lead tones and gaps are not used with the disk drive. The drive receives an instruction to read or write

a particular sector, and it executes that instruction on its own.

There are, however, a number of different kinds of information storage in the ATARI system. BASIC LISTed files, Assembler source files, and the textfiles of a number of word processors simply contain the ATASCII characters of that file all in a row. BASIC SAVED files contain the tokenized statements (which look meaningless without the action of the BASIC cartridge), and related tables. DATA files contain numbers in either listed or binary form, depending on how they were stored. Binary files contain the binary information stored directly, with a header indicating the nature of the file and the starting and ending address where the file is to be located.

On cassette, this information is *sequentially* sent out over the serial bus, but the disk drive is a random-access device that allows named files (e.g., "D1:MYPROG.BAS"). So, the filemanager (FMS) part of the Disk Operating System (DOS), has to organize all the sectors in some way. One aspect of DOS is that each sector contains a three-byte link pointing to the next sector in the file, giving the file number in the directory, and counting the number of bytes actually in use in that sector. This means that in the standard disk file each sector has only

125 bytes available.

Since we normally use CIO, ATARI's most intelligent I/O system, we are not usually aware of what is happening. BASIC in all its I/O functions utilizes CIO. Besides opening and closing files, it controls the STATUS function, "record"-related I/O (a record is terminated by a carriage return: \$9B) in INPUT and PRINT, and single-byte organized I/O in PUT and GET.

One function *not* supported by BASIC is the BLOCK I/O. Just as in PUT or GET, BLOCK I/O does not care at all about the content of the transfer, it just wants the buffer address for the file and its length. BASIC does use it for SAVE and LOAD functions, and the DUP.SYS part of DOS supports it in numerous ways, like BINARY LOAD or SAVE. But otherwise you cannot use it for your program from 8K Atari's BASIC (Note: OSS BASIC A+ users are provided with that capability).

BOOT records are structured differently, although they still adhere to 128-byte sector and record system. The actual layout of a boot file is very similar between cassette and disk. This is where our advantage is gained. A boot file is nothing more than all the binary information in a row (usually a

continued on page 78

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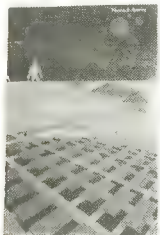
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machine-language program), preceded by a header. The header contains information about the number of records in the file, the starting address where the program is to be moved, and the initialization address where the Operating System is to jump during [RESET] and after boot continuation. It will then load the indicated number of sectors or records into memory, and jump to continuation right after the header.

If it is a single-stage boot, the continuation will only set memory limits and DOS vectors, stop the cassette motor to overcome a bug in OS, set the CARRY flag if everything is okay, and return. Multiple-stage boots do not simply return, but continue the loading process. For example, DOS uses only three boot sectors for 384 bytes of info, and then the boot continuation loads the DOS.SYS file. Our program cannot deal with multi-stage boots, since they are impossible to predict, but single-stage boots are all similar.

So, to copy a cassette all we have to do is pull the cassette boot into a buffer, and then write it out to cassette again. To copy to disk, write the buffer one sector after another as a simple boot record, starting at sector 1. Note: the disk will not be a DOS disk, just as most game disks are not. Since single-stage cassette- and disk-boot look the same, it ought to work. Right, but there is one difficulty.

GET or PUT are much too slow to deal with the SIRQ used by the cassette boot file. INPUT or PRINT would work, but the first time they encounter a \$9B (carriage return) they return unpredictably. Thus, we must implement a machine-language call. The routine provided in lines 2000 to 2100 does just that. It can be POKEd into a string, since it is relocatable. You simply OPEN and CLOSE in a normal way, and use the subroutine instead of PUT or GET. Note that in the OPEN call for the cassette, we have the auxiliary information 128 (Line 3210), this sets up CIO for SIRQ. In the USR call, we have to supply the CHANNEL (e.g. OPEN #1 -), and we have to state whether we want to PUT or GET with number 7 or 11. We also

supply the buffer address, and length, since this is required for BLOCK I/O.

The routine will return a 0, if you did not supply the right number of parameters. Under CIO, a 1 is the code for successful completion. If you loaded a file, and your buffer was larger than the length of the file required, the USR call will return with a 136. This is fine, since that tells you to look at locations 203 and 204 for the actual length (number of bytes) of the file you just loaded (your friendly subroutine placed it there.) From BASIC, a $LENGTH = PEEK(203) + 256 * PEEK(204)$ will return the answer. Oh, yes, if your call $ERROR = USR \dots$, then naturally, ERROR will be equal to the codes I just described.

This takes care of the cassette, but the boot disk does not use CIO, and its 128-byte sector format precludes use of the FMS, anyway. We have to call the disk handler, with lines 1000 to 1140. Disk I/O always happens in 128-byte blocks, so adjust for that. Since CIO is not used, no files have to be opened or closed, but error codes (except for end-of-file, of course) are the same. The routine is general enough so you can read as well as write.

Since BASIC itself takes up a rather large space, the program is divided into two parts to give you a maximum-size buffer. To make it self-loading, save both parts with 'LIST "C:"; then a simple RUN"C:" from BASIC will set up your system. It will load both parts, if you add this line—325 POKE 764,12 (as if you were hitting [RETURN] upon the second RUN "C:"). The double BEEP from the cassette-open command will call you when the system is ready.

CBOOTMGR not only does the job of commercial programs costing \$20 or more, but it also gives you some handy subroutines for fast and unusual I/O from BASIC. Good luck, and if you have questions or comments, write to me c/o ANTIC.

```
10 REM CASSETTE BOOT MANAG
  ER VERS.2.0
20 REM
```

```
25 REM BY H.E.STRIEPE 13J
  UL82
30 REM
35 REM THIS PROGRAM IS IN
  THE PUBLIC
40 REM DOMAIN, FURTHER DIS
  TRIBUTION
42 REM MUST CONTAIN THIS R
  EFERENCE !
45 REM
46 REM WRITTEN FOR ANTIC,
47 REM THE ATARI RESOURCE,
48 REM AND FRIENDS
49 REM
50 REM
51 REM >>>THIS IS PART A <
  <<
52 REM
55 REM NOTE: THIS PROGRAM
  CONTAINS
60 REM RELOCATABLE SUBROUT
  INES THAT
65 REM CAN BE USED FOR GEN
  ERAL I/O
70 REM FROM BASIC AND BASI
  C A+.
75 REM ( THE LATTER ALREAD
  Y HAS A
80 REM FAST BINARY LOAD RO
  UTINE ).
81 REM THESE SUBROUTINES C
  OULD ALSO
82 REM BE STORED IN STRING
  S.
83 REM
85 REM
86 REM TO ENHANCE SPACE UT
  ILIZATION,
87 REM THIS PROGRAM IS IN
  TWO PARTS.
88 REM THIS PART A IS FOR
  SET-UP OF
90 REM SUBROUTINES, PART B
  DOES THE
91 REM ACTUAL WORK; OTHER
  SCHEMES ARE
92 REM POSSIBLE. FOR CASS.
  VERSIONS,
93 REM PART B SHOULD BE SAV
  ED WITH
94 REM 'SAVE "C:". COMPATA
  BILITY WITH
95 REM BASIC A+ HAS BEEN R
  ETAINED.
96 REM
99 REM
200 REM THIS ROUTINE SETS U
  P SCREEN
210 REM
220 GRAPHICS 0:POKE 710,146
  :POKE 712,144:POKE 752,
  1:?:?"CASSETTE BOOT M
  ANAGER VERS.2.0"
230 ? "by H.E.STRIEPE 1982"
  :?
240 ? :? :? :? :? "This pro
  gram permits the duplic
  ation of privately own
  ed single-stage"
```

continued on page 80

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```

250 ? "cassette boot tapes
    to cassette or":? "disk
    .":? :?
260 ? "      DO NOT USE TO IL
    LEGALLY COPY
    COPYRIGHTED MATERIAL !
    !!      "
270 POKE 703,4:REM OPEN UP
    BOTTOM WINDOW
299 REM
300 REM NOW WE LOAD SUBROUT
    INES, AND
301 REM CALL THE COMPANION
    PROGRAM
302 REM
305 ? CHR$(125):? "LOADING
    MACHINE LANGUAGE ROUTIN
    ES..."
310 GOSUB 1010:GOSUB 2010
320 ? CHR$(125):? "LOADING
    MAIN PROGRAM..."
325 REM POKE 764,12 for CAS
    SETTE vers.
330 RUN "D:CBOOTMGB":REM ((
    (( CHANGE TP 'RUN "C:"
    ' FOR CASSETTE VERSION
    NOTE: CBOOTMGB must
    have been saved
340 REM with ' SAVE "C:" '
    999 REM
1000 REM THIS SUBROUTINE ADD
    S DISK

```

```

1002 REM HANDLER ROUTINE EXP
    ECTING
1003 REM DISK DEV#,DISK COMM
    AND
1004 REM (ASC("w") OR ASC("R
    ")),start
1005 REM SECTOR,SECT COUNT,B
    UFFER ADD
1006 REM AS USR CALL ARGUMEN
    TS
1007 REM
1010 SUBSTART=1600:SUBEND=16
    82
1020 FOR X=SUBSTART TO SUBEN
    D
1030 READ Y:POKE X,Y:NEXT X
1040 DATA 32,68,218,104,201,
    5,208,74
1050 DATA 104,104,141,1,3,10
    4,104,141
1060 DATA 2,3,104,141,11,3,1
    04,141
1070 DATA 10,3,104,133,204,1
    04,133,203
1080 DATA 104,141,5,3,104,14
    1,4,3
1090 DATA 32,83,228,48,35,17
    3,4,3
1100 DATA 24,105,128,141,4,3
    ,173,5
1110 DATA 3,105,0,141,5,3,23
    8,10

```

```


1120 DATA 3,208,3,238,11,3,1
    98,203
1130 DATA 208,222,198,204,16
    ,218,160,1
1140 DATA 132,212,96
1150 RETURN
1999 REM
2000 REM BINARY PUT/GET SUBR
    OUTINE
2002 REM LOAD ROUTINE EXPECT
    ING I/O
2003 REM CHAN.,COMMAND(7-GET
    ,11-PUT),
2004 REM BUFF ADD,BUFF LENGT
    H
2005 REM AS USR CALL ARGUMEN
    TS
2006 REM GET COMMAND RETURNS
    FILE
2007 REM LENGTH IN %CB & %CC
    (203/204)
2008 REM
2010 SUBSTART=1700:SUBEND=17
    51
2020 FOR X=SUBSTART TO SUBEN
    D
2030 READ Y:POKE X,Y:NEXT X
2040 DATA 32,68,218,104,201,
    4,208,43
2050 DATA 104,104,10,10,10,1
    0,170,104
2060 DATA 104,157,66,3,104,1
    57,69,3
2070 DATA 104,157,68,3,104,1
    57,73,3
2080 DATA 104,157,72,3,32,86
    ,228,132
2090 DATA 212,189,72,3,133,2
    03,189,73
2100 DATA 3,133,204,96
2110 RETURN

```

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FOR USE WITH ATARI® 400/800 COMPUTER



Wave after wave of horrid black insects waving their feelers! Tough, age-old ants. Perhaps they'll rule the world, after man becomes extinct through war and pollution. How do you want your Anteater? Eat him raw, bit by bloody bit. Command your slaveants to kill the Anteater by laying deadly eggs. Or maneuver him by stealth under a crushing rock. Will the little varminits take over? Or will the Anteater out-feeler them? Play and see. May the best species win! Ideal for picnics.

ROMOX™
Romox Inc.
501 Vandell Way
Campbell, CA 95008
(408) 374-7200

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TYPE TABLE

Variable checksum = 537508

Line num	range	Code	Length
3000	- 3150	TG	228
3160	- 3260	VD	532
3270	- 3510	VT	330
3520	- 3640	UC	445
3650	- 3790	NC	440
3800	- 4090	AG	450

```

3000 REM THIS IS PART B OF C
    BOOTMGR
3010 REM
3020 REM VERS. 2.0
3030 REM BY H.E. STRIEPE 198
    2
3040 REM
3100 REM INITIALIZATION
3110 REM
3115 DIM A$(10)
3120 BASTOP=PEEK(144)+256*PE
    EK(145)

```



```

3130 MEMTOP=PEEK(741)+256*PEEK(742)
3140 BUF=BASTOP+100
3150 BUFLN=MEMTOP-BUF
3160 GT=7:PT=11:WT=ASC("W"):RD=ASC("R")
3200 ? CHR$(125);"INSERT BOOT SOURCE CASSETTE INTO":? "CASSETTE DRIVE, PRESS PLAY,":? "AND PRESS RETURN"
3205 REM TYPE 'PLAY' AND 'RETURN' IN PREVIOUS LINE IN INVERSE VIDEO (ATARI LOGO KEY)
3210 OPEN #1,4,128,"C":REM SHORT IRQ
3220 ? CHR$(125);"LOADING CASSETTE BOOT FILE..."
3230 ERROR=USR(1700,1,GT,BUF,BUFLN)
3240 CLOSE #1:LINE=3200:GOSUB 4050
3250 IF ERROR=1 THEN ? CHR$(125);CHR$(253);"INSUFFICIENT BUFFER SPACE...":FOR T=1 TO 250:NEXT T:RUN
3260 FILELEN=PEEK(203)+256*PEEK(204)
3270 REM
3280 REM THIS ROUTINE ASKS FOR
3290 REM INPUT ON WHETHER CASSETTE OR
3300 REM DISK BOOT IS DESIRED
3310 REM
3320 ? CHR$(125);"DO YOU WANT A COPY ON CASSETTE":? "OR DISK (C/D)":INPUT A$
3330 IF A$(1,1)="C" THEN 3740
3340 IF A$(1,1)="D" THEN 3550
3350 ? CHR$(253);"INCORRECT RESPONSE..."
3360 GOTO 3320
3500 REM
3510 REM THIS ROUTINE CREATES A
3520 REM BOOT DISK
3530 REM
3550 ? CHR$(125);"INSERT A FORMATTED DISK INTO"
3560 ? "DRIVE #1, PRESS RETURN":REM TYPE 'RETURN' IN INVERSE VIDEO
3570 DRIVE=1:STRTSECT=1:SECTCNT=INT(FILELEN/128)+1
3580 OPEN #2,4,0,"K":GET #2,A:A$=CHR$(A):CLOSE #2: ? A$
3590 ? CHR$(125);"WRITING BOOT DISK..."
3600 ERROR=USR(1600,DRIVE,WT,STRTSECT,SECTCNT,BUF)
3610 LINE=3550:GOSUB 4050
3620 ? CHR$(125);"DO YOU WANT ANOTHER"

```

```

3630 ? "COPY (Y/N)":INPUT A$
3640 IF A$(1,1)="Y" THEN 3320
3650 RUN
3700 REM
3710 REM THIS ROUTINE CREATES ANOTHER
3720 REM BOOT CASSETTE TAPE
3730 REM
3740 ? CHR$(125);"INSERT DESTINATION CASSETTE, PRESS":? "RECORD AND PLAY, AND PRESS RETURN"
3745 REM TYPE 'RECORD', 'PLAY', AND 'RETURN' IN PREVIOUS LINE IN INVERSE VIDEO
3750 OPEN #1,8,128,"C"
3760 ? CHR$(125);"WRITING BOOT FILE..."
3770 ERROR=USR(1700,1,PT,BUF,FILELEN)
3780 CLOSE #1:LINE=3740:GOSUB 4050
3790 ? CHR$(125);"DO YOU WANT ANOTHER COPY (Y/N)":INPUT A$
3800 IF A$(1,1)="Y" THEN 3320
3810 RUN
4000 REM

```

```

4010 REM THIS SUBROUTINE EXAMINES THE
4020 REM ERROR VALUE RETURNED FROM THE
4030 REM USR FUNCTION
4040 REM
4050 IF ERROR=1 OR ERROR=136 THEN RETURN:REM NORMAL I/O EXIT OR END OF FILE
4060 IF ERROR=0 THEN 4090
4070 ? CHR$(125);CHR$(253);"I/O ERROR, CHECK PERIPHERALS":? "AND TRY AGAIN..."
4080 FOR T=1 TO 300:NEXT T:POP:GOTO LINE
4090 GRAPHICS 0:POSITION 2,14: ? CHR$(253);">>>> PROGRAM ERROR, REVIEW USR ARGUMENTS...":STOP

```

TYPO TABLE

Variable checksum = 533080


Line	num	range	Code	Length
3000	-	3150	VS	228
3160	-	3260	BX	532
3270	-	3510	WR	330
3520	-	3640	VU	445
3650	-	3790	OE	440
3800	-	4090	CK	450

A

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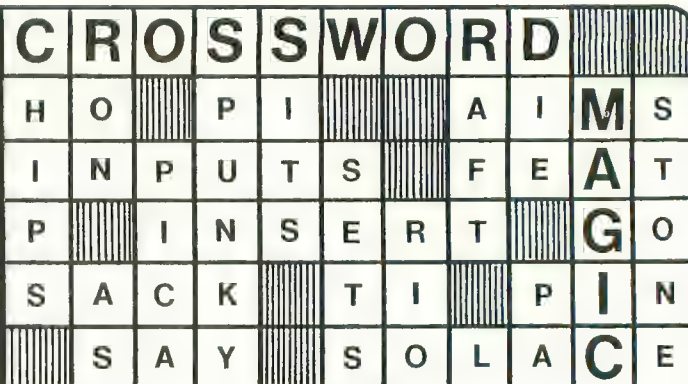
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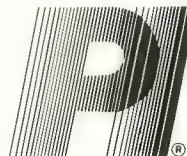
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BASIC COMMANDER

MMG Micro Software
P.O. Box 131
Marlboro, NJ 07746
(201) 431-3472
\$34.95

16K — Diskette
Reviewed by Roy D. Wolford

Serious Atari BASIC programmers will love this powerful programming tool. **BASIC Commander** combines many programming aids that are generally found only as separate programs. This diskette provides the following features: an automatic line-numbering generator, a renumbering program, a block delete program, seven programmed keys, three programmable keys, six DOS function keys and a "help" file. The only catch is that this program uses 7.4K of memory, a small price to pay for the benefits derived.

To load the program, turn on your disk drive, insert the diskette, plug in the BASIC cartridge, and turn on the computer. **BASIC Commander** will load in about 22 seconds. Remove **BASIC Commander**, insert your program diskette, and you are ready to go.

The automatic line-number generator assigns and enters line numbers for you at increments you choose, within the range of 1 to 32767. The default values are 10 (starting line numbers) and 10 (increment). After choosing your values, press [RETURN] and the first line number is displayed with the cursor positioned one space to the right, ready for you to type.

New line numbers can even be entered in the middle of an existing program. The only danger is if the new starting line number is the same as an existing line number. If this happens, the existing line number will be erased. However, when **BASIC Commander**

detects this, two beeps will sound and the autonumbering mode is exited. This prevents accidental erasing of an existing line number.

The renumbering program is just as simple to call. Press [SELECT] and you will be prompted to enter "INCREMENT AND START" values. Again, the default values are 10,10. Once the line number values are entered, press [RETURN], and it's done; 500 lines are renumbered in 3 seconds. Your program is renumbered, including all line reference statements like GOTO and GOSUB. Any indirect line references like GOTO A or GOSUB 4*A are not renumbered, but the line numbers on which they occur are listed on the screen so that you can easily edit them.

The block delete program is called by pressing [OPTION]. You will be prompted to enter "START AND END" values. After entering the values, press [RETURN] and all the line numbers within and including the starting and ending values are deleted. Both the renumbering and block delete modes can be exited by pressing the [BREAK] key.

As mentioned earlier, there are seven programmed keys. These keys, in conjunction with the CTRL-key, perform frequently used functions. The functions are Save, Enter, List, ?#6, Load, Run and a listing of all variables you have used in your BASIC program. The respective keys used are S, E, O, P, L, G, and V. To enter the desired command, in either immediate (no line number) or deferred (with line number) mode, simply press the CTRL-key and the desired programmed key simultaneously, enter your filename, then press [RETURN]. The command will be entered as if you typed the entire line.

The next set of keys consists of three that are programmable by the user. First press the CTRL-key and Q key

together. The prompt "SELECT KEY (A,B OR C)" will be displayed. Choose any one of the keys and press [RETURN]. You will then be requested to enter any command or statement desired, to a maximum of 36 characters. For longer statements (maximum of 108 characters), the three keys can be strung together.

The last set of keys is used to call six DOS functions without leaving the BASIC program, using the same procedure as is used with the other programmed keys. The six functions are Directory, Lock, Unlock, Delete, Rename, and Format. The respective keys used are D, K, U, X, R and F. All functions work as if DOS DUP.SYS was being used. This is needed, because **BASIC Commander** will be erased from memory if DOS is ever accessed.

In case you want to use the graphics character instead of the programmed function of a key, you can toggle back and forth from the programmed mode to nonprogrammed mode by pressing CTRL-0 (zero).

If you ever need help, type RUN"D:HELP" and press [RETURN]. MMG Micro Software provides excellent documentation, and a small self-adhering label with all options printed on it. **BASIC Commander** is covered by warranty and enhancements will be made available.

WAYOUT

Sirius Software
10364 Rockingham Blvd.
Sacramento, CA 95827
(916) 366-1195
\$39.95 48K — Diskette

Reviewed by David Duberman

Video games now rank as one of the most popular forms of entertainment,

continued on next page

and for several reasons. Most people would agree that their ability to remove you from reality is not the least common of them. A game's success in the marketplace can often be determined by how well it helps you to escape from this world and transport you into another reality.

Wayout is such a game and it puts you into another world better than any other video game I have seen. Published by Sirius Software, the setting for this other reality is a series of mazes. At the game's outset you can choose from any of 26 different mazes with names like Towers, Flowers and Worms. You travel through the chosen maze at eye-level (the walls are right in front of you) and you can see your progress in an inner square centered on the screen. Above the square are two compasses that indicate your forward motion and below that is a map that shows where you are within the maze.

The graphics that appear before you as you move through the maze are more *life-like* and dramatic than I have ever seen. What I really want to say is — WOW! The 3-D animation and the quick response of the display to your joystick movements make this game the last word in alternate-reality simulation. Lots of games try to accomplish this, but Sirius has created one here that surpasses others in reaching that goal. I found that it took me about ten minutes to get a feel for moving about in the maze.

In each maze, the object is to find the exit — the way out. Each maze is extremely long and convoluted, so this is no easy task. Your progress is constantly hampered by a mischievous creature known as the Cleptangle. It is a playful but annoying entity that lurks about trying to steal your compass and mapmaker. If it catches up with you and takes either or both, you may still move about the maze, but your direction is no longer guided. You can

detect the Cleptangle's presence when you hear a low, rippling tone and if you act fast you can evade it or track it down. Usually you will just want to avoid it, but if it has already stolen your map or compass you will want to get them back.

Wayout has two features that allow you to save the game for later. In the first you may transfer the game to disk at any point. You may also press [SHIFT] and any number key from 1 to 6 to save your progress at any given point.

This game is one that many software designers have dreamed of writing, so kudos to Paul Edelstein for this state-of-the-art achievement. Wayout is an instant classic, and a game that no ATARI owner should be without. Even if you don't play it (unthinkable!), it makes a stunning graphics demo.

“TRICKY TUTORIALS”

Educational Software
4565 Cherryvale Ave.
Soquel, CA 95073
(408) 476-4901
\$19.95–\$29.95
16K Cassette
24K Diskette

Reviewed by David and Sandy Small

Maybe you have just bought your ATARI, or perhaps you've had it for a while, but something strange happens to you on your way to becoming a 9th Class Star Raiders Super Commander. Suddenly you realize that you actually want to learn what makes this machine tick.

So, you settle down to learn about the ATARI. The BASIC Reference Manual is, we agree, hopeless; the Assembler/Editor Manual, ditto. How about *De Re Atari*? It's a great

book, but a little technical; and the OS/Hardware manuals, are completely incomprehensible.

You will be tempted to throw up your hands and go back to playing Shamus. I should know; I dedicated more than a year to finding out about this machine, and it was good to find someone who could really help. His name is Robin Sherer, founder and president of Educational Software, formerly Santa Cruz Educational Software.

Robin wrote a series of programs, the **Tricky Tutorials**, complete with a number of short demonstrations and examples, on various subjects. At last count, they were:

1. Display Lists.
2. Horizontal/Vertical Scrolling.
3. Page Flipping.
4. Basics of Animation.
5. Player/Missile Graphics.
6. Sound and Music.
7. Disk Drive Utilities.
8. Character Graphics.

If you're a computer snob, you're going to hate this stuff. It is written in an easygoing, plain fun style, definitely not dry and boring! Robin is a friendly person, and he wants to teach, not feed his ego. Still, he knows what he's talking about. He doesn't try to convert you to hexadecimal or assembly language; he shows you what the machine is about in BASIC (no small feat).

Robin's code is not perfect, by any means, and there are a few flaws in the booklets too. But overall the Tutorials are accurate and provide much-needed practice using the ATARI's special capabilities.

Looking at someone else's code is one of the best ways to improve a programmer. Robin's code is all open — not copy-protected — go-ahead-and-play-with-it good stuff. He stays with the novice, and tries to pass on

valuable techniques. If you need some examples of locating a P/M bitmap on a page boundary, Robin's code will show you the ins and outs.

Some of the Tutorials were written by Jerry White, who has written an amazing amount of stuff for the ATARI. Adding Jerry to his group of programmer/writers gives Robin even more capabilities and promises more tutorials for the future.

The Tutorials come in an attractively-packaged illustrated booklet, with easily readable text. The sample programs come on either disk or tape, and may be loaded and run directly.

If you're used to paying \$39.95 for games, then \$19.95 each for Tutorials 1, 2, 3, 4 and 6 will please you. The others are \$29.95. They are all very much worth it, and if you're not happy, you'll get a refund. All six Tutorials, purchased together, come in a very nice binder for the price of \$99.95. This package will provide quite a bit of help for you.

Not to be overlooked is Educational Software's **Master Memory Map**. This is a handy list of just about every ATARI memory location you ever wanted. I have this map pinned up on the wall as a quick reference guide. It is very helpful, and a steal at \$6.95.

One other point about the quality of these products; this company has been in business for some time. As other software houses have learned, if you don't turn out a quality product, you don't get repeat customers. (Remember Crystalware?) Robin has plenty of repeats, and I've never heard a complaint about his products — just good comments.

The Tricky Tutorials are good products, fun to learn with, and valuable aids in learning about the ATARI. I'd recommend them to anyone making the first big steps into learning about the machine. Atari, Inc. certainly

thinks so; it's one of Robin's biggest customers.

DISKEY

Adventure International
P.O. Box 3435
Longwood, FL 32750
(800) 372-7172, orders only
(305) 863-6917, business
\$49.95, 32K — Diskette

Reviewed by Dave Mentley

Diskey is a comprehensive collection of routines neatly tied together to allow you to unlock your drive for diagnostic, recovery or whatever reasons you may have. Many of the functions are available on other disk utility packages or through users' groups libraries of public domain software, but a few of the key routines are unique to Diskey (Erase Disk without reformatting and Special File Copy without any directory entry, for example.) Diskey is written in BASIC with many Assembly routines which give it an edge over other utilities as far as speed goes.

My philosophy on packaged software is that if the program is not designed so that the documentation is intuitively obvious, then the program is not for me. In other words, like most of you, I don't read instructions. If you do not read the excellent booklet (61 pages) supplied with Diskey not only will you be missing out on a lot of valuable information, but you won't be able to do anything at all with this program.

What can you do with Diskey? Generally, you will be able to read any readable sector on a disk, modify sectors to your specifications, modify directory entries and trace and repair files. Files with major damage (which happens when you lay your floppy disk on your 100 watt speaker magnet or drop a gob of cream cheese on the

media surface) cannot be repaired. Minor damage (such as a scratch or laser hole which only damages one or two sectors) can be readily repaired with practice. Old, inexpensive disks may lose integrity as the magnetic domains relax and become difficult to read (this may take years). Diskey can be used to read and reread the weak sectors until an intact replica is made and the file can be reconstructed on another good disk. My directories tend to get scrambled after many deletions and saves to the same disk. Diskey can be used to patch the directory enough to safely move your good files to a new disk.

The tools available in Diskey (I counted 57) can be grouped into 8 types: Read routines, Zap (modify and write), Informational, Search, Error Discovery, Copy, Repair and Support. While there are too many to relate here, I will try to cover a few of the more remarkable tools.

Briefly, you can: build a disk map with detailed diagnostics (empty sectors along with discontinuous, bad, ending, etc.), search for a string of up to 20 bytes on the disk, find the code that will load into a specific memory address in a binary load file, rebuild the VTOC, check for RPM of drive, trace a file and follow linking and referrals from directory, copy a file with a dead directory using only the file number, select an Exclusive OR sector map print mask (got that?) and dump the screen to printer at any time. Hitting the "X" key will abort most routines while in progress and "P" will dump to the printer.

There really is nothing you could add to Diskey to improve it. (That's what they said about the 4K RAM chip, too.) It is written for the near beginner and will make you into an intermediate user with steady application.

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(305) 862-6917

\$24.95

24K Diskette, 16K Cassette

Reviewed by David Plotkin

BASIC Routines for the ATARI, from
Adventure International, is a collec-
tion of utility programs in Atari BASIC
written by the prolific Jerry White.
Many of the routines have been pub-
lished before, some are even in user-
group libraries. Nevertheless, the com-
bination of informative booklet and
disk (or cassette) make for a well-
rounded package.

BASIC Routines is not meant to be a
tutorial. While it is possible to learn a
great deal from studying the listings
and from the clear, concise explana-
tions, some knowledge of BASIC is
assumed. This software is aimed at the
intermediate user — the bulk of us
who aren't really beginners, but
haven't reached the Assembly Lan-
guage level yet. However, it is possible
to use most of these routines even
without understanding how they
work. If you need a string sort, for ex-
ample, you can use the one provided.

The routines range from simple to
complex. You start with such things as
turning off sound, reading the joy-
sticks and paddles, material really suit-
able for beginners. You quickly pro-
gress to a masterful Player-Missile
Graphics demo packed with useful in-
formation (including some Assembly
subroutines for animating shapes).
The package finishes up with some
very useful utilities, tips on program
speed and conserving memory, and a
list of useful memory locations and

how to use them. The utilities include
such general-purpose tools as disk util-
ities (formatting, unlocking a file,
etc.), Binary to Decimal conversion,
and Basic Line Delete.

The manual encourages the user to
experiment with the programs, and the
documentation is more than adequate
for that, explaining what each section
of code does. Jerry uses the "named
GOSUB" capability of the ATARI to
good advantage. You can GOSUB
DING where DING was defined ear-
lier in the program. One minor prob-
lem with the documentation is the
quality of the printing — the listings
are hard to read. Of course, you can
call up the particular program and
read the listing from the computer, but
it would be helpful if the print quality
were better.

BASIC Routines gets especially high
marks for PMDEMO and MODE123
(the custom display list). Both of these
programs are fairly long and very use-
ful. MODE123 includes enough back-
ground on display lists so that, with
some experimentation, you should be
able to customize your own displays.
The greater-than-average amount of
documentation is appropriate, since
modifying display lists is one of the
more difficult aspects of programming
the ATARI.

Finally, the Sound demo includes a
large number of sounds which can be
included in your own program, and
there is information on how to
generate those ultra-low base notes.

Overall, BASIC Routines for the
ATARI is a good value. The combina-
tion of good documentation, printed
listings and useful utilities are a worth-
while investment. Jerry White encour-
ages you to experiment and dig into
the listings. Take it from a guy who did
it exactly this way, you will be con-
stantly learning new things and your
efforts will be richly rewarded.

JEEPERS CREEPERS

Quality Software
6660 Reseda Blvd., Suite 105
Reseda, CA
\$29.95 — 32K Diskette

Reviewed by Marty O'Donnell

Jeepers Creepers is the most original variation on the video maze game that I have yet seen. The mazes in **Jeepers Creepers** are actually interconnected pathways that divide the playfield into many rectangles, as streets separate city blocks.

When the game begins, all the pathways in the maze are orange. As your player, the bug, moves along, it changes the color of the pathway to yellow. When all four sides of a rectangle are colored yellow, the players freeze momentarily while the interior of the rectangle turns blue. You are awarded points for each blue rectangle you make, according to the size of the rectangle.

As you move around the maze, three wasps will appear and try to sting you. If stung, you will lose one of your five lives. Some of the rectangles in each maze contain the image of a beetle. When you complete the pathway around one of these rectangles, a beetle will appear to seek out and eat one of the wasps. Each maze has randomly-placed super beetles which can speed up briefly and eat many wasps (shades of PAC-MAN).

There are also rectangles labeled "jump" which allow you to escape wasps by jumping instantaneously to a random point elsewhere in the maze. You are awarded one jump for each of these rectangles you complete, and jumps can be used at any time during the game by pressing the joystick button.

The playfield is done in one of the

ATARI's medium resolution graphics modes (Antic modes 13/OS mode 7). Below the maze, a text display indicates the current score, high score, jumps remaining, lives remaining and "coast" mode. If you choose to coast, the bug will move in the direction the joystick was last pointed. If the coast mode is off, the bug stops when the joystick is in the neutral position.

My complaints about **Jeepers** are minor. I would like multi-colored players and a save-high-score feature.

Jeepers Creepers lives up to its publisher's name — it is quality software and I recommend it, especially to arcaders and maze-game fans.

MINER 2049er

Big Five Software
P.O. Box 9078-185
Van Nuys, CA 91409
(213) 782-6861
\$49.95
16K — Cartridge

Reviewed by Deborah Burns

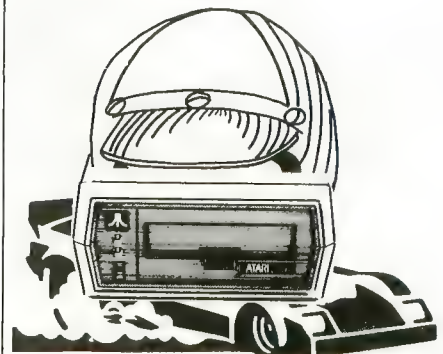
"Bounty Bob" in **Miner 2049er** looks like a typical 1849 gold-rush prospector, but his obstacles in this game are much more futuristic. Deadly mutant organisms and radioactive waste plague his progress through the mine shafts instead of angry Indians or claim jumpers. Like the popular arcade game **Donkey Kong**, the object of this game is for the player to travel to the top of a ladder (in this case, mine shaft) and score points along the way.

The colorful screen displays ten different zones in which the scene of the mine shaft changes. Each new zone is increasingly difficult. In Zone 2, the slides cause you to slip just as you are proceeding up the shaft. In Zones 4 and 5, you must jump from one lillipad to another, but if you land somewhere in between you are wiped out.

continued on page 90

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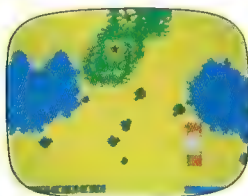
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Program by Dennis Zander

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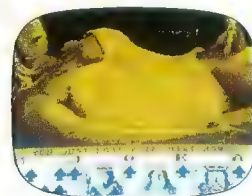
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IT'S ABOUT TIME

by G. Herzenstiel

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- Two learning units and a game
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1:20

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by B. Belian



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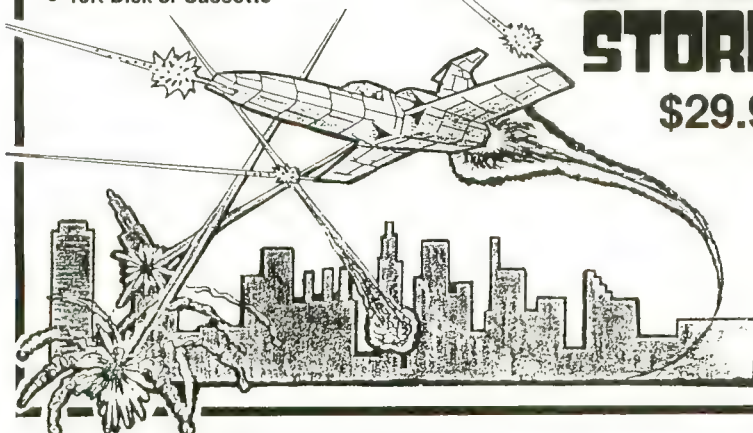
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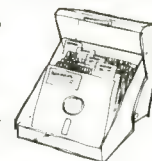
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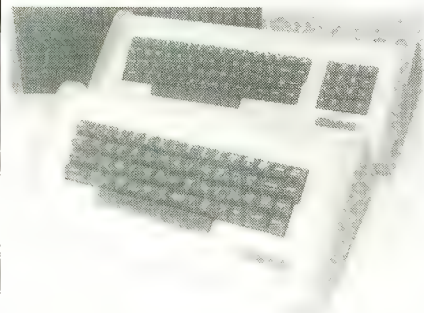
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PRODUCT REVIEWS

continued from page 87

In Zone 9, the obstacles are much more complex, and if you fall you are destroyed by the pulverizers.

In every zone you must avoid contact with the mutants that guard each station within the mine shaft. These mutants are usually fatal, but they can be rendered harmless. As you climb the shaft and score points by gathering tools along the way, the mutants turn green and edible and are no longer dangerous.

Miner 2049er is a challenging and complicated game, and much more difficult than it first appears. The manual clearly explains all the levels and objects of the game and how the various strategies can be executed. You may freeze your play momentarily or begin a new game at any time. A cannon may be fired by pressing the spacebar and in some zones you may "beam up" to another level.

Miner 2049er begins with a demonstration screen where "Bounty Bob" appears, accompanied by the popular gold-rush tune "Clementine". This game transports the '49er from the Wild West of the 1800's to the 21st century world of mutants and lasers.

HOME FILING MANAGER

Atari Inc.
P.O. Box 427
Sunnyvale, CA 94086
\$49.95
16K Diskette

Reviewed by Chris Chabris

The Home Filing Manager is a new program from Atari that performs all of the standard database functions in a much more approachable manner than most of the complex systems on the market today. Each screen shows a picture of an ordinary index card with one red and seventeen blue lines. You simply type the card exactly as you

want it to look. Inverse video and graphics characters may not be used, but full screen-editing capabilities are available.

When booted, this pure machine-language program displays a well-drawn picture of a file box under the title block, and prompts the user to insert a data diskette. Each diskette contains one file of 115 to 700 cards. After booting, the program diskette is no longer needed during the session.

Three menus are used:

1. **Diskette Menu** — used to prepare (format) or switch data diskettes. Each data diskette is allowed a name of up to 18 uppercase characters.

2. **Main Menu** — lists the major options available, such as flipping through cards, searching, and quitting.

3. **Display Menu** — a line of choices shown above the card display, showing commands related to printing, editing, erasing, and writing cards.

Selection of menu options is simple: press [SELECT] until the desired option is highlighted in inverse video. Then press [START] to begin that selection. Audio cues enhance the selection process.

Searching capabilities are not as comprehensive as those of larger systems, but I have found them adequate for all of my needs. One may "fetch" a card according to its title (defined as anything typed on the card's red line); or search the entire data diskette for all cards containing a specific phrase anywhere on the card, including in the title.

The documentation, provided in a 28-page booklet liberally sprinkled with realistic screen diagrams, includes a tutorial as well as a flowchart of program operation. After studying it for about twenty minutes, I had virtually no more questions about the program's use. No reference card is included, as the program is so easy to learn.

In summary, it must be stated that large database systems will have more functions and greater capacities, and probably will be less user-friendly than The Home Filing Manager. However, this program lives up to its name. It is truly a "home" filing manager.

The **Home Filing Manager** will be offered soon as part of the new **Home Manager Kit**, which will include the Personal Financial Management System program.

BAJA BUGGIES

Gamestar
1302 State St.
Santa Barbara, CA 93101
(805) 963-3487
\$31.95
16K Diskette and Cassette

Reviewed by Marc R. Benioff

Baja California is a 1000-mile-long Mexican peninsula that has been for some years the site of grueling desert races for off-road vehicles called Baja buggies. Usually these buggies are beefed-up, stripped-down old Volkswagens. Now there is a new computer game from Gamestar named **Baja Buggies** that lets you pretend you are driving in this race.

Since you are the novice driver, you start *last* — in a field of 80 other cars. Your goal is to finish first, and that means you have to pass all the competition. You steer with the joystick and can brake by pushing the fire button.

When the race begins your car automatically spurts ahead at full speed and you pass a few other cars. The buggy bounds through a 3-D landscape of realistic and dangerous scenery. The track is narrow and collisions with other cars can only be avoided by using extreme care.

Your position improves as the game progresses — 50th, 49th, 48th. Maybe you *can* catch up with the first three

cars. A small "radar" display at the bottom of the screen shows your relative position.

The game ends when the first car crosses the finish line. I have managed to place tenth in the race, but Gamestar claims it is possible to make it to second or third.

Baja Buggies is an excellent product. Compared to driving games of the past, this is a programming masterpiece. It has some similarities to "Turbo" by Sega, but it is not just a copy. It was created by Scott and Keith Orr, formerly of Arcade Plus, whose Ghost Hunter was a popular PAC-MAN lookalike. The Orrs left Arcade last June, and started Gamestar in October. This is their first product.

TAX DODGE

Freefall Associates
Box V
Bethel Island, CA 94511
(415) 684-2664
\$39.95
32K Diskette

Reviewed by Davey Saba

Tax Dodge is a clever computer game that looks and feels much like PAC-MAN. The main features of the game are the scrolling maze, through which a player figure travels in search of money and fringe benefits, and five tax agents that are constantly after your player.

The game revolves around your ability to collect cash and avoid being touched by the tax agents. Much like the board game Monopoly, you may achieve your goal by passing over certain sections and gaining certain credits. For example, if you go past the space that says "accountant," you get a tax shelter. You may gain or lose advantages however, some of which are deductions, court dates, tax havens, etc.

ERRATA

In the program "Spider", which was printed in ANTIC #3, the string ERASE\$ should be filled with ten "hearts" (CONTROL-COMMA characters) in line 170. This allows the trail of the spider to be erased as it moves vertically.

We have been receiving a great deal of correspondence lately. If you would like a personal response, please enclose a stamped self-addressed envelope.

Tax Dodge comes with a small pamphlet which adequately describes the game and gives directions. The game is difficult to master and sometimes gets frustrating, much like filling out your tax form on April 14th! One problem with the game is that the player figure is more difficult to control compared to other arcade-type games. On the plus side, it does have a freeze action feature (press the space bar).

While most players will probably enjoy Tax Dodge, accountants and lawyers with computers would really go for it. Tax Dodge is an interesting and amusing game with some new twists. The game should have good staying power, and it is at least one legal way to beat the IRS.

The game is very realistic. As in real life, the more cash you earn, the more harassment you get from the tax agents. In fact, there is even an IRS office in the center of the maze. Other features are the surprise audits and the mysteriously vanishing tax deductions.

Progress is judged by the amount of earnings you acquire in a year. A scoreboard at the bottom of the screen keeps track of the account and to advance to higher income levels you must produce more and more cash. The game also has a time-keeping feature, and if you are not finished by April 15th and back at home base, you are busted and the game ends.

continued on next page

PRODUCT REVIEWS

MENUMAKR

Computer's Voice
2370 Ella Dr.
Flint, MI 48504
(313) 238-5585
\$24.95
16K — Diskette
8K — Cassette

Reviewed by David Duberman

Menumakr is a program that writes programs. It can be used to create menus for programs you are writing, or to write characters, screen by screen. This saves you the work of determining plot points and specifying their contents.

Suppose you lay out a screen of


instructions for a program you are writing. **Menu**makr will scan your screen, identify the characters involved and their locations, and write the BASIC statements to recreate it in your program. Creating attractive screens will make your products more professional.

The file created by **Menu**makr can be saved to either cassette or diskette. The file will be BASIC statements that can be used to begin a program (a title or instruction menu, for example), or merged with an existing program. The screens are saved in List form.

The BASIC statements that print information all begin with a POSITION statement that you can manipulate by editing, if necessary. A "clear

screen" character is automatically inserted at the beginning of each new screen of characters, and a routine checks for [RETURN] at the end of each screen. These features can be used or altered as you see fit.

Documentation with the product offers some ideas for still other uses. It could read and print "status" screens showing information updated from the last reading, or create multiple, independently-updated graphics displays for game programming.

Menumakr is limited to BASIC Graphics Mode 0, but seems to be a helpful and interesting utility none the less. 

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continued from page 52

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100 R: ***** PILOT SOUNDER *****
110 R:
120 R: ANTIC VOL 1, NO. 6
130 R: K. W. HARMS
140 R:
150 *MAINLINE
160 R:
170 U: *STARTUP
180 R:
190 *SENSE
200 R:
210 J(%J0=0)+( %J0=5)+( %J0=6)+( %J0=10):
*SENSE
220 R: JUMP TO SENSE IF JOYSTICK IDLE
230 R: OR ON DIAGONAL
240 C: #T=%T8 [SENSE TRIGGER ON JOYSTIC
K
250 C: #J=%J0 [SENSE JOYSTICK POSITION
260 U(#T): *CURSORMOVE [TRIG PRESSED
270 U(#T=0): *VALUECHANGE [NO PRESS
280 J: *SENSE [WORK DONE, SENSE AGAIN
290 R:
300 *CURSORMOVE
310 R:
320 POS: (#C*10)-5, #R+1
330 T: [10 BLANKS
340 C(#J=4): #C=#C-1 [MOVE LEFT
350 C(#J=8): #C=#C+1 [MOVE RIGHT
360 C(#J=1): #R=#R-5 [MOVE UP
370 C(#J=2): #R=#R+5 [MOVE DOWN
380 R: CALCULATE WRAPAROUNDS
390 R: ONLY COLUMNS 2 & 3 ARE OK
400 R: ONLY ROWS 5, 10, 15 & 20 ARE OK
410 C(#C=1): #C=3 [TOO LEFT, GO RIGHT
420 C(#C=4): #C=2 [TOO RIGHT, GO LEFT
430 C(#R<5): #R=20 [TOO FAR UP, GO DOWN
440 C(#R>20): #R=5 [TOO FAR DOWN, GO UP
450 R: PRINT CURSOR IN NEW POSITION
460 POS: (#C*10)-5, #R+1
470 T: ~~~~~ [6 REVERSE SHIFT *S
480 PA: 15 [SLOW DOWN FOR HUMANS
490 E:
500 R:
510 *VALUECHANGE
520 A: #R [PUT ROW # INTO ACCEPT REG.
530 M: 5, 10, 15, 20
540 JM(#C=2): *FVOICE0, *FVOICE1, *FVOICE
2, *FVOICE3
550 R: LINE ABOVE JUMPS ON VALUES
560 R: OF ROWS IN THE ACCEPT REGISTER
570 JM(#C=3): *CVOICE0, *CVOICE1, *CVOICE
2, *CVOICE3
580 R: SAME FOR CONTROL VALUES
590 E:
600 R:
610 *FVOICE0
620 C(#J=1): #Q=#Q-1 [LOWER VALUE
630 C(#J=2): #Q=#Q+1 [HIGHER VALUE
640 C(#Q>255): #Q=0 [WRAPAROUND
650 C(#Q<0): #Q=255 [DITTO
660 POS: (#C*10)-5, #R
670 T: #Q [REM IS SPACE HOLDER
680 C:@B53760=#Q [VALUE INTO REG

```

```

690 E:
700 R:
710 *FVOICE1
720 C(#J=1): #S=#S-1 [#R & #T WERE
730 C(#J=2): #S=#S+1 [ALREADY USED
740 C(#S>255): #S=0 [WRAPAROUND
750 C(#S<0): #S=255 [DITTO
760 POS: (#C*10)-5, #R
770 T: #S [REM IS SPACE HOLDER
780 C:@B53762=#S [VALUE INTO REG
790 E:
800 R:
810 *FVOICE2
820 C(#J=1): #U=#U-1 [LOWER VALUE
830 C(#J=2): #U=#U+1 [HIGHER VALUE
840 C(#U>255): #U=0 [WRAPAROUND
850 C(#U<0): #U=255 [DITTO
860 POS: (#C*10)-5, #R
870 T: #U [REM IS SPACE HOLDER
880 C:@B53764=#U [VALUE INTO REG
890 E:
900 R:
910 *FVOICE3
920 C(#J=1): #V=#V-1 [LOWER VALUE
930 C(#J=2): #V=#V+1 [HIGHER VALUE
940 C(#V>255): #V=0 [WRAPAROUND
950 C(#V<0): #V=255 [DITTO
960 POS: (#C*10)-5, #R
970 T: #V [REM IS SPACE HOLDER
980 C:@B53766=#V [VALUE INTO REG
990 E:
1000 R:
1010 *CVOICE0
1020 C: #D=(#W/32) [BASIC'S DISTORTION
1030 C: #L=#W\32 [MODULO IS LOUDNESS
1040 U: *FACTOR
1050 C: #W=#D+#L
1060 POS: (#C*10)-5, #R
1070 T: #D+#L=#W [SPACE HOLDER
1080 C:@B53761=#W [INTO CNTRL REG
1090 E:
1100 R:
1110 *CVOICE1
1120 C: #D=(#X/32) [BASIC'S DISTORTION
1130 C: #L=#X\32 [MODULO IS LOUDNESS
1140 U: *FACTOR
1150 C: #X=#D+#L
1160 POS: (#C*10)-5, #R
1170 T: #D+#L=#X [SPACE HOLDER
1180 C:@B53763=#X [INTO CNTRL REG
1190 E:
1200 R:
1210 *CVOICE2
1220 C: #D=(#Y/32) [BASIC'S DISTORTION
1230 C: #L=#Y\32 [MODULO IS LOUDNESS
1240 U: *FACTOR
1250 C: #Y=#D+#L
1260 POS: (#C*10)-5, #R
1270 T: #D+#L=#Y [SPACE HOLDER
1280 C:@B53765=#Y [INTO CNTRL REG
1290 E:
1300 R:
1310 *CVOICE3

```

continued on next page

PILOT YOUR ATARI

```

1320 C:#D=(#Z/32) [BASIC'S DISTORTION
1330 C:#L=#Z\32 [MODULO 15 LOUDNESS
1340 U:*FACTOR
1350 C:#Z=#D+#L
1360 POS: (#C*10)-5, #R
1370 T: #D+#L=#Z [SPACE HOLDER
1380 C:@B53767=#Z [INTO CNTRL REG
1390 E:
1400 R:
1410 *FACTOR
1420 C(#J=1):#L=#L-1 [LOWER VALUE
1430 C(#J=2):#L=#L+1 [HIGHER VALUE
1440 C(#L>15):#D=#D+1 [15 IS HIGHEST
1450 C(#L>15):#L=0 [LOUDNESS LEVEL
1460 C(#L<0):#D=#D-1 [0 IS LOWEST
1470 C(#L<0):#L=15 [WRAPAROUND
1480 C(#D>7):#D=0 [LEVEL 7 IS HIGHEST
1490 C(#D<0):#D=7 [LEVEL 0 IS LOWEST
1500 C:#D=#D*32
1510 E:
1520 R:
1530 *STARTUP
1540 GR:QUIT [CLEAR SCREEN
1550 C:@B752=1 [TURN OFF CURSOR
1560 POS:2,3
1570 T: VOICES PITCH # CONTROL #
1580 POS:2,4
1590 T: VOICE 0 53670 53761
1600 POS:2,9
1610 T: VOICE 1 53672 53763
1620 POS:2,14
1630 T: VOICE 2 53674 53765
1640 POS:2,19
1650 T: VOICE 3 53676 53767
1660 C:#R=5 [SET UP ROW FOR START
1670 C:#C=2 [SET UP COLUMN FOR START
1680 POS: (#C*10)-5, #R+1 [START POS
1690 T:^^^^^^ [6 REVERSE SHIFT *S
1700 E:

```

```

10 R: SPECIAL EFFECTS
20 R: ANTIC VOL 1, NO.6
30 R:
40 U:*REGISTERS
100 U:*BOUNCINGBALL
110 U:*JACKHAMMER
120 U:*LIGHTNING
490 E:
500 R:
510 *BOUNCINGBALL
520 C:#Z=6[NUMBER OF BOUNCES
530 *BALL1
540 C:#Y=22*2
550 *BALL2
560 POS:18, (#Y/2)+1
570 T: [SPACE HOLDER
580 POS:18, (#Y/2)
590 T: ^ [CTRL
600 C:@B#A=(#Y*10)/2
610 C:@B#B=224+((#Y/4)-5)
620 C:#Y=#Y-1
630 J(#Y>10):*BALL2
640 PA:15
650 *BALL3
660 POS:18, (#Y/2)-1

```

```

670 T: [SPACE HOLDER
680 POS:18, (#Y/2)
690 T: ^ [CTRL
700 C:@B#A=(#Y*10)/2
710 C:@B#B=224+((#Y/4)-5)
720 C:#Y=#Y+1
730 J(#Y<(22*2)): *BALL3
740 C:#Z=#Z-1
750 C:@B#A=0
760 C:@B#B=0
770 J(#Z>0): *BALL1
780 E:
1000 R:
1010 *JACKHAMMER
1020 GR:QUIT
1030 C:@B752=1[TURN OFF CURSOR
1040 C:#Z=0
1050 U:*PICTURE
1060 *JACKHAMMER1
1070 C:@B#A=103
1080 C:@B#B=96+14
1090 POS:16,17
1100 T: [CTRL S
1110 PA:@B20
1120 SD:0
1130 POS:16,17
1140 T: [TYPE A SPACE
1150 PA:@B20/7
1160 C:#Z=#Z+1
1170 E(#Z=15):
1180 J:*JACKHAMMER1
1190 *PICTURE
1200 C:@B84=8 [SETS ROW
1210 C:@B82=14[SETS MARGIN
1220 T: [BLANK TO MOVE TO MARGIN
1230 T: [6 CTRL N
1240 T: [CTRL V,BLANK,CTRL B
1250 T: [SAME AS 1180
1260 T: [SAME AS 1180
1270 T: [SAME AS 1180
1280 T: [CTRL G,BLANK,CTRL F
1290 T: [CTRL B, CTRL V
1300 T: [3 BLANK, REVERSE BLANK
1310 T: [3 BLANK, CTRL S
1320 C:@B82=2 [RESETS MARGIN
1330 POS:2,18
1340 T:
1350 R:LINE ABOVE IS 76 REVERSE SPACES
1360 E:
1500 R:
1510 *LIGHTNING
1520 C:#X=-70
1530 GR:CLEAR [HERE TO TURN ON SCREEN
1540 T:
1550 T:NEVER TWICE IN THE SAME PLACE,
EH?
1560 R:
1570 *LIGHT1
1580 U:*STRIKE
1590 U:*SOUND
1600 C:#X=#X+14
1610 PA:60
1620 J(#X<75):*LIGHT1

```



```

1630 PA:300
1640 GR:QUIT [BACK TO TEXT
1650 E:
1660 R:
1670 *STRIKE
1680 C:#S=3):#S=0
1690 C:#S=#S+1
1700 GR(#S=1):PEN YELLOW
1710 GR(#S=2):PEN RED
1720 GR(#S=3):PEN BLUE
1730 GR:GOTO -#X,47
1740 GR:DRAWTO 0,-31
1750 E:
1760 R:
1770 R:
1780 *SOUND
1790 C:#F=0
1800 *SOUND1
1810 C:@B#A=#P
1820 C:@B#B=0+(14-(#P/20))
1830 C:@B#C=#P
1840 C:@B#D=128+(14-(#P/20))
1850 C:#P=#P+5
1860 J(#P<240):*SOUND1
1870 PA:3
1880 SO:0

```

```

1890 PA:60
1900 E:
9800 R:
9810 *REGISTERS
9820 C:#A=53760[PITCH VOICE 0
9830 C:#B=53761[CNTRL VOICE 0
9840 C:#C=53762[PITCH VOICE 1
9850 C:#D=53763[CNTRL VOICE 1
9860 C:#E=53764[PITCH VOICE 2
9870 C:#F=53765[CNTRL VOICE 2
9880 C:#G=53766[PITCH VOICE 3
9890 C:#H=53767[CNTRL VOICE 3
9900 E:

```



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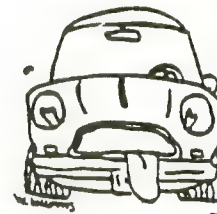


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Memory Map

PAGE 2 CONTINUED

Memory Map is an on-going feature of ANTIC. See issues #1, 2 and 3 for previous installments. We intend to publish the function of all the low memory RAM locations. The

Example: format for our description is:

12 \$C 2 DOSINI The Operating System variable called DOSINI uses 2 contiguous locations starting at address 12 (decimal) or C (hexadecimal).

673	\$2A1	1	TMPLBT	??
674	\$2A2	1	ESCFLG	Used by screen editor. Flag set to \$80 when ESC[\$1B] character detected. Reset to 0 following output of next character. Causes character following ESC to be displayed only exception is EOL [\$9B].
675	\$2A3	15	TABMAP	Logical line start.
690	\$2B2	4	LOGMAP	Logical line bitmap. When a bit is set then a logical line starts at the corresponding physical row number. All bits set to 1 when text screen is opened or cleared.
694	\$2B6	1	INVFLG	Inverse video flag toggled by ATARI logo key sets bit 7 = 1
695	\$2B7	1	FILFLG	Indicates to display handler whether current operation is fill < > 0 or draw = 0
696	\$2B8	1	TMPROW	??
697	\$2B9	2	TMPCOL	??
699	\$2BB	1	SCRFLG	Scroll flag set to number of physical lines-1 that were deleted from top of screen. Since logical lines range from 1 - 3 physical lines then this variable ranges from 0 - 2
700	\$2BC	1	HOLD4	Used to save and restore value in ATACHR[\$2FB] during fill process when ATACHR is temporarily set to value in FILDAT[\$2FD]
701	\$2BD	1	HOLD5	Temporary used by draw
702	\$2BE	1	SHFLOK	Shift/control lock flag initialized to \$40 at powerup \$00 = normal mode lower case alpha \$61-\$7A \$40 = caps lock upper case \$41-\$5A \$80 = control lock \$01-\$1A
703	\$2BF	1	BOTSCR	Bottom of screen = 4 then mixed mode, = 24 then normal
704	\$2C0	4	PCOLR0 - PCOLR3	Player color registers and shadows = COLPM0[\$D012] = COLPM1[\$D013] = COLPM2[\$D014] = COLPM3[\$D015]
708	\$2C4	5	COLOR0 - COLOR4	Playfield color registers. = COLPF0[\$D106] = COLPF1[\$D017] = COLPF2[\$D018] = COLPF3[\$D019] = COLBK[\$D01A]

713	\$2C9	23	SPARE	**
736	\$2E0	2	GLBABS	Contains entry address of code for auto-boot / run
738	\$2E1	2	SPARE	**
740	\$2E4	1	RAMSIZ	Size in pages of available RAM permanently retains RAM top address contained in TRAMSZ[\$6] with BASIC and 48K this = \$160 = 40960
741	\$2E5	2	MEMTOP	Top of available user memory RAMSIZ less display list and display memory. (first nonuseable address) This value established by powerup logic and reset re-established when screen display is opened
743	\$2E7	2	MEMLO	Bottom of available user memory established at powerup and reset, not altered after that
745	\$2E9	1	SPARE	**
746	\$2EA	4	DVSTAT	Device status buffer Get status command puts information in these bytes
750	\$2EE	1	CBAUDL	Cassette baud rate low byte
751	\$2EF	1	CBAUDH	Cassette baud rate high byte
752	\$2F0	1	CRSINH	Cursor inhibit flag if = 0 then cursor on. If > 0 then no visible cursor
753	\$2F1	1	KEYDEL	Key delay set to 3 whenever key code accepted. Decrement every 1 / 60 sec by stage 2 VBLANK process until it reaches 0
754	\$2F2	1	CHI	Prior key code read and accepted. Current key pressed compared with contents of CH1 if same then debounce time checked if OK then accepted if current key not same as CH1 then accepted. When accepted stored in CH[\$2FC]
755	\$2F3	1	CHACT bit 2 = 1 bit 1 = 2 bit 0 = 1	Shadow for CHACTL[\$D401] char control register causes current character line to invert sampled at every char. line in 40 char. mode if bit 7 of current char. code = 1 then char is blue on white in 40 char. mode if bit 7 of current char. code = 1 then char. will be blank. blinking char. produced by setting bit 7 of char. and periodically changing bit 0 here
756	\$2F4	1	CHBAS	Vector to page address of character set init'd to E0 (upper case and punctuation) char set in ROM is \$E000-\$E3FF shadow for CHBASE[\$D409]
757	\$2F5	5	SPARE	**
762	\$2Fa	1	CHAR	Contains internal code corresponding to what is in ATACHR[\$2FB]. This will be converted to ATASCII
763	\$2FB	1	ATACHR	ATASCII character for most recent char read or written or value of the graphics point. This value also determines color of line in draw and fill commands.
764	\$2FC	1	CH	Holds keyboard code for a character (not ATASCII) keyboard handler gets all data from here when it gets a character it writes \$FF here to indicate code read. This location loaded when a key is pressed causing an IRQ interrupt which vectors at \$208. This interrupt service routine loads the code into \$2FC for processing at VBLANK stage 2
765	\$2FD	1	FILDAT	Right fill data for draw
766	\$2FE	1	DSPFLG	Display flag will allow control codes other than EOL [\$98] to be displayed if flag <> 0. If flag = 0 then control codes processed normally
767	\$2FF	1	SSFLAG	Start / stop flag toggled by control-1 keys cleared by break key, reset key, or powerup

PAGE 3

DCB DEVICE CONTROL BLOCK

Used for handler / SIO communication and between user and disk handler.

768	\$300	1	DDEVIC	Peripheral unit 1 bus I.D. number
769	\$301	1	DUNIT	Unit number
770	\$302	1	DCOMND	Bus command
771	\$303	1	DSTATS	Command type status return
772	\$304	2	DBUFLO	Data buffer pointer. Set by handler to indicate source or destination data buffer



TO BE CONTINUED IN ANOTHER ISSUE



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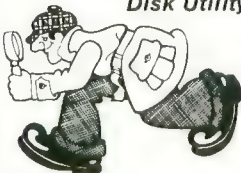
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STRATOS

(game)
Adventure International
P.O. Box 32750
Longwood, FL 32750
(800) 327-7172, orders only
(305) 862-7172, business
\$34.95
16K Cassette
32K Diskette

In this space-war game the capitol city of New Earth — Stratos — is invaded by the M'korg, a race of slug-like beings. Stratos defends itself from attack by using the Armageddon Wave Device and the Force Envelope. A simple but imaginative arcade type game.

INSIDE ATARI BASIC

(book)
Reston Publishing Co., Inc.
Reston, VA 22090
\$12.95

Friendly, is the word to describe this introduction to Atari BASIC. Illustrations and examples provide a walking

tour through the bewilderment of BASIC. It's as good a start as you can get before leaving the beaten path. Includes simple color and sound commands.

PICNIC PARANOIA

(game)
Synapse Software
5327 Jacuzzi St., Suite I
Richmond, CA 94804
(415) 527-7751
\$35.00
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32K Diskette

This game of many levels pits you and your picnic lunch against the depredations of ants, spiders and wasps. The insects are bent on stealing your food in front of your very eyes, and will succeed unless you are an agile swatter. Many little things are happening at once in this frustrating contest. It's enough to make you want to eat indoors.

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Atari, Inc.
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continued on next page

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OSS says this is "the finest integrated Assembly Language development system yet." Ideal for writing small as well as large routines, it significantly reduces the rigamarole required by other macro systems. MAC-65 is compatible with EASMD (also from OSS) and the Atari Assembler/Editor cartridge. Object code produced is compatible with Atari DOS, OS/A+, and even Apple DOS.

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RAMROD is a new operating system board to replace the existing 10K OS board from Atari. Main advantage of RAMROD is to free up more of the 800's potential 64K of RAM space by using less than the Atari OS. However, Atari OS is retained on RAMROD and may be switched-in when desired. Excellent for spreadsheet and word-processor programs, and useful for some languages.

ATARI 400 48K UPGRADE KIT

(memory expansion)
Micro Systems Exchange
P.O. Box 4033
Concord, CA 94524
(415) 355-7130
\$99.95

This kit contains the necessary chips, wiring and resistors to upgrade the ATARI 400 to a 48K computer. The instructions are designed for the novice, and lead through a *simple* installation procedure.

Use your current memory board so as not to change in any way the designed features of the ATARI 400. The memory chips *replace* the chips on the memory board (all are pop-outs). Several small wires must be soldered.

WORDFUN!

(educational game)
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(game)
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PDI also announces "Step by Step," a program to teach BASIC.

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(tax management program)
Atsuko Computing
International
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(game)

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16K — Cartridge

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16K — Cartridge

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(game)

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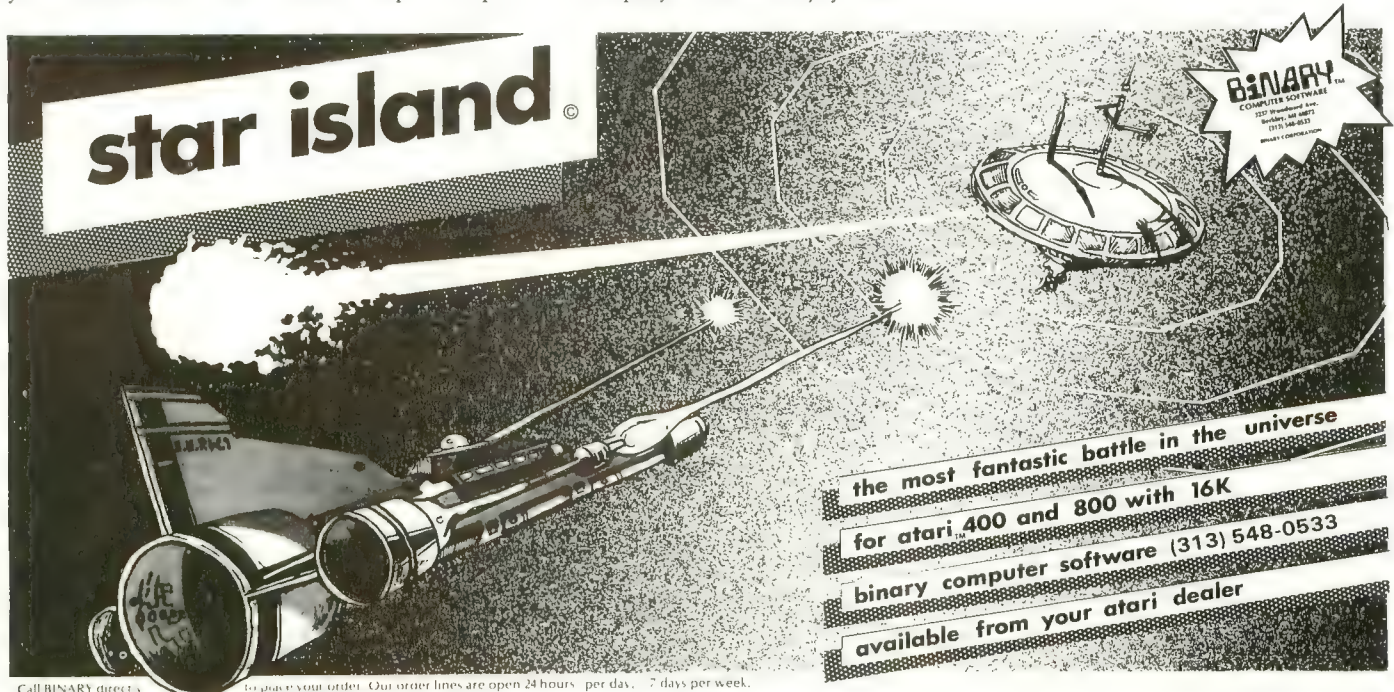
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ATARI'S MOTHER TONGUE

by DANIEL GRAU

It seems not so long ago that I was programming my microcomputer by keying-in lists of hexadecimal numbers, and I was fortunate. Altair and Imsai owners had to enter their bootstrap programs by toggling an array of 24 switches for each byte of data. At that time I was the proud owner of a MOS Technology KIM microcomputer with a 6502 microprocessor and, yes, one whole kilobyte of memory.

Nowadays there are tools, like the wonderful Assembler Editor cartridge by Atari, for those who want to speak to the machine in its mother tongue. The 6502 machine language is one of the most elegant and efficient of all microcomputer languages, and it's my pleasure to share some information to help you learn to use this language.

The Atari Assembler Editor Manual assumes that the reader is already familiar with Assembly Language, and suggests, as suitable study texts, Lance Leventhal's *6502 Assembly Language Programming* and *Programming the 6502* by Rodney Zaks. In Appendix B, the *6502 Programming Manual* is added to the list. I will summarily review these and other well-known books.

6502 Assembly Language Programming and its companion, *Assembly Language Subroutines*, by Lance Leventhal (Osborne-McGraw Hill) are outstanding books. Both have extensive and very clear explanations of programming, 6502 architecture and Assembler instruction sets. The former also explains Assemblers, input/output operations, peripheral chips and 6502 interrupts. However, they are not easy reading for rank beginners.

Programming the 6502, by Rodney Zaks (Sybex), deserves a note of caution. The first edition was full of errors. The editors put out a revised second edition, and later a third. Edition three still contains confused notions and some errors. The writer might be proficient with the 8080 — or perhaps even the 6800 — but not with the 6502. For instance, one program assumes that "load accumulator" (LDA) does not set the zero flag, which is true for the 8080. Another place, bit 7 is tested by loading the accumulator and then using the bit test instruction (BIT). This is needed in the 6800, but not in the 6502. These examples are not isolated, I can quote them by the fistful.

The *SY6500/MCS6500 Microcomputer Family Programming Manual* by SYNERTEK (3050 Coronado Drive, Santa Clara, CA 94086) is a reprint of the original manual by MOS Technology, the inventors of the 6502 chip. A pocketbook version can be had from Rockwell International Corp. (P.O. Box 3669, Anaheim, CA 92803).

This is *the* mother manual. Large chunks of its tables, addressing modes descriptions, lists of mnemonics and execution times, etc., can now be found in other texts. Since the beginner's first task is to learn the instruction set and the

way the 6502 works, and considering that this book set the rules, it is a *must* for the library of any 6502 programmer. It is clearly written, well explained and not expensive. Still, it is not sufficient as a learning text for the rank beginner.

6502 Software Design, by Leo J. Scanlon (Sams & Co., Inc.) is one of the best choices for learning Assembly Language. While some program examples are oriented specifically to the Rockwell AIM single-board computer, this in no way detracts from the perfect understanding of the programming algorithms and processes. If you buy only one book, let it be this one.

The ATARI Assembler, by Don and Kurt Inman, is very difficult to recommend. Did either of them ever program in 6502 Assembler? If so, why endow the 6502 with a 16-bit stack pointer? (Fig. 1-5). On pages 7 and 87 they again assert that "the stack pointer and program counter are large enough to hold a full length address (0 to 65535)." In spite of this, this book has the virtue of familiarizing the reader with the ATARI Assembler cartridge, and does so somewhat better than the Atari Assembler Editor Manual itself. However, do not expect to learn to program in Assembly Language from this book alone. You will need previous knowledge of the way the 6502 and its instruction set work.

Beyond Games: Systems Software for your 6502 Personal Computer, by Ken Skier is, without doubt, very interesting. After 13 chapters of tutorial information (also with some trivial errors), we are treated to program listings of working monitors, disassemblers and text editors for the OSI, the Apple and the ATARI computers. These programs could be employed in lieu of the Atari Assembler cartridge to learn how to program in machine language, and do not use any subroutine of the ATARI Operating System. The author has programmed his own set, since, as he says, the ATARI's power "breeds complexity".

This brings us to the most pressing problem the aspiring ATARI Assembler Language programmer will have: how to integrate machine language programs into the ATARI system. The hardware and Operating System manuals give scant information on the way the various subroutines work. The program listings, which cost another twenty dollars, do not even contain the disk operating system, or the printer output routines. It is also fairly difficult to transfer the assembled machine language programs in memory into BASIC program, which is where many of us will want to put them.

We still need a book which describes all the routines, memory addresses, logic diagrams, chip signals, and many more things hidden in the innards of the ATARI. Let us hope that someone eventually will write it; and, until then, let's also hope that the wait is short.



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6. Artillery: firing strategy game
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- test all memory
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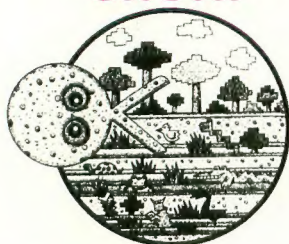
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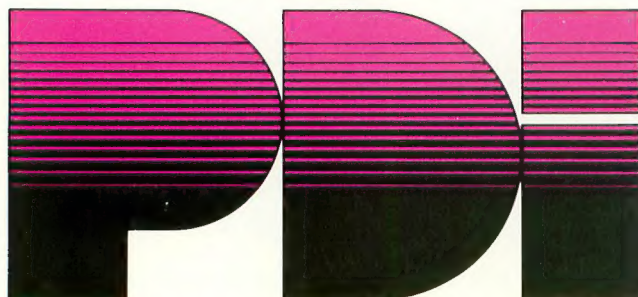
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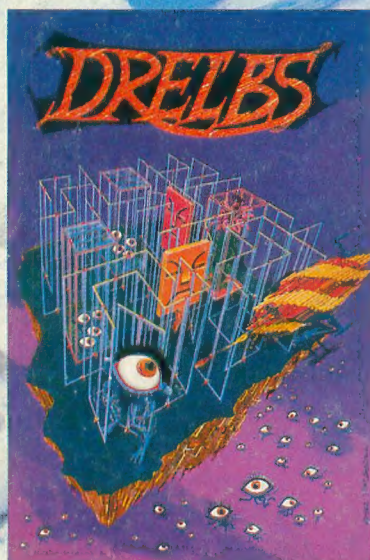
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